SOCIETY FOR ADVANCEMENT OF MANAGEMENT



# Advanced Management

COMBINED WITH MODERN MANAGEMENT

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VOL. XV NO. 6

JUNE 1950

Volume XV Number 6

June 1950



# Advanced Management



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ADVANCED MANAGEMENT, published monthly by Society for Advancement of Management, 84 William Street, New York 7, N. Y., is merged with MODERN MANAGEMENT, and is successor to The Society for the Advancement of Management Journal, the Bulletin of the Taylor Society and of The Society of Industrial Engineers. Re-entered as second-class matter, December 23, 1949, at the Post Office at New York, N. Y., under the Act of March 3, 1879.  Subscription rate: $8.00 per year. Single copies: 75 cents (members); $1.00 (non-members). An index to ADVANCED MANAGEMENT is published annually, and the contents are also indexed in *Industrial Arts Index* which is available at Public Libraries. Notification of address changes must be given four weeks in advance.

# The Philosophy of the Society's Founders

**I HAVE just been reading the editorial comment in the *S.A.M. Journal*, Volume 1, No. 1, January 1936. It occurred to me that it would be of interest to all of us to review the early concept of the founders of our Society.**

". . . this Society aims to *advance* the science and art of management; not merely to reiterate old truths or to accept present principles and methods as final solely because they have worked in the past.

"This mandate to advance implies two things. It implies bringing more corporate managements and executives up from the rear guard into awareness and use of the best modern methods. And it implies pushing out into pioneer territory our exploration of new management problems in relation to new and changing economic and social conditions."

"Management as science and art is a *social* science and art. It shares with the other social sciences the need for a grasp of objectives, principles, and methods which relate them to *human* concerns. The apparatus of the social sciences is different from that of the physical sciences. As yet this truth is too little appreciated. It is different for many reasons, but fundamentally because the test of *what is true* is far less easily determinable than in the physical sciences. And the possibility of validation of what is true by actual experiment is far less easy. For what is true in social, human concerns (such as those of management) is not quickly discovered or proved. 'In the long run' is always the qualifying factor in evaluation of management methods scientifically viewed.

"Management will earn the rank of a science, and managers will earn the right to be true professionals, only when they view their labors as ministering to society and to the social good in the long look."

"It is the recognition and definition of a professional standard and of an ethical obligation which are the true justification for a management society today — and for *our* Society.

"Let us do everything possible in this new alliance to bring the less well equipped up to the best known practices of today.

"But let us also not forget that we are always moving forward to tomorrow — to new problems and new conditions.

"Let us aim straight but aim high.

"Let us help to make management a real profession. And on this platform —

"Long live the Society for the Advancement of Management!"

**These excerpts from the editorial comment of the first issue of the Journal are worthy of our considered thought at this time. Here is the measuring stick against which we can gauge our accomplishment to date and the basis on which we can chart our course for the future.**

**The vision and insight of the founders of our Society have paved the way for our accomplishments to date. We must accept the challenge of finding new and better ways to advance the science and art of management, observing the high ethical standards of the management profession and the tenets so carefully inculcated in this first editorial comment.**

DILLARD E. BIRD

# Successful Programs Must Be Sold to Management

By LOUIS A. ALLEN
Training Administrator, Koppers Co., Inc.

***Does a good idea always sell itself? Experience proves the value of careful planning and good "selling techniques" applied to administrative ideas.***

FEW of us spend days assembling a gasoline engine but neglect to devote a last hour to installing the spark plugs. Yet this sort of thing happens in our industrial organizations as regularly as time clocks check men in and out to work. In countless filing cabinets stand row after row of folders which mark the paper graves of well-conceived, carefully developed programs that failed because their sponsors had neglected to spend the few hours necessary for installing the spark plugs: these programs failed because they were not sold.

No program is better than the people who must carry it out *want* to make it. The most carefully executed procedure set up by the industrial engineer or personnel man can stumble along at a fraction of its potential effectiveness, crippled by lack of salesmanship. This holds true in every case where people must be depended upon to accomplish the final result. The success of job evaluation, materials handling, unit costs, or any other program is proportional to the extent to which all who are responsible for carrying it out have *bought* that program.

The steps necessary to sell engineering and personnel programs are similar to those used in finding customers for any quality product. Here are some of the things you should do for a sales campaign that will spark your program to success.

Top management in your organization must be behind your program before it can succeed. If the top men are actively sponsoring your proposal, your sales quota is already well on its way; if not, better plan to stay with your top group until you have them sold.

A direct approach to the top man is not always necessary or desirable. In some cases you can explain your program to a key man subordinate to the chief. If you can get the No. 2 man to carry your story in to the boss, you have enlisted the aid of an excellent advocate.

After you have received enthusiastic endorsement at the top, enlist as much high bracket assistance as you can to carry the story down the line. Heads of Divisions or Departments can lend a golden glitter to your sales talk if they make it obvious that they have studied your proposal and they think it is good. Obviously it is poor policy to try to win the support of line and staff personnel by brandishing in front of them the approval of the big boss. However, since it is human nature to look with respect upon the decision of our superiors, you can gain needed prestige for your proposal by demonstrating that it *is* sponsored by the top men.

## BE SURE OF GOOD SALES "PITCH"

This means that you must be able to hammer home your points to an audience in concise, effective fashion. A golden voice and flowing gestures aren't necessary, but clear facts accurately presented are.

How to prepare a hard-hitting sales presentation? First write down those things you want understood and remembered after you've finished your talk. This should take no more than two paragraphs, but be sure it sums up the essentials of what you have to sell.

Now outline those things you believe you should say to prove the main points you have set down. Do this carefully, thinking always in terms of the group to whom you will make your sales talk. Try to anticipate their needs and requirements; tell them what you can do for *them*. Every good salesman forgets himself when he makes a sale.

Use visual aids to help explain your message. A sales type fold-over easel binder makes an excellent medium. Legibly print your key points on the white insert sheets and illustrate them with tracings or line sketches. Leave plenty of white space. Don't be afraid to use color. Arrange your sheets in reverse order and place them on the fold-over top of the binder so that you must drop sheet one to make it visible. As you do so, you will be looking at the blank back of sheet two. On this convenient surface you can print the key words that will cue your remarks to the sheet your audience is looking at.

**. . . new programs must be sold like any other product. Left: C. T. Lile, Personnel Manager, Koppers Co., Inc. Right: L. A. Allen, Training Administrator, Koppers Co., Inc.**

Get the total situation firmly in mind before you set up the meeting that will be the scene of your sales effort. Remember that your plan will not be accepted or endorsed before it is understood. So prepare yourself by studying the material you have outlined until you are prepared thoroughly to state all the facts of your case: WHAT your program is; HOW it will work; WHERE it is to apply; WHO is to participate; WHY it is necessary.

## ADAPT TERMS TO GROUP

*Arouse the interest of the group to which you are talking.* The best way to do this is figuratively to pick out one man in the group and tell him what the program will mean to *him.* If you are explaining your proposal to supervisors, discuss it directly in terms of the problems and responsibilities of supervision. There is no point in telling a foreman that the new program will cut down Unabsorbed Burden or Plant Overhead Expense. Save that for the Plant Manager and his staff. Supervisors will recognize and understand references to their *unit* costs or the number of men who quit their jobs.

To some groups you will be able to make broad, general statements about improved morale, increased productivity, and more effective use of human resources. To others, you will want to talk about such specifics as keeping gold bricks on the job, beating the grapevine, and the probability of improvement in specific areas.

The important thing to remember is that you must talk in terms of things that are familiar and important to the individual members of the group.

*Show that a need for your program exists.* Perhaps the best way to do this is to start with an analysis of the situation. Describe the activities that are now being carried on in the field your proposal is intended to cover. Give a frank estimate of the good things that are being done and then point out the deficiencies. Stick close to the facts; steer clear of unsupported opinions or invalid generalizations.

Now present your proposal in detail. Keep in mind always that you are presenting a proposal—not a final plan of action. Describe what your program can do. Tell what other organizations have accomplished with similar procedures.

If possible, talk in terms of a concrete situation to which your proposal could be applied. For instance, if your program is methods improvement, talk about an actual instance which could be improved, or which *was* improved in a pilot situation. If training is your project, an example might be the fact that a definite number of grievances are getting past the first step at a cost of a specific number of dollars. This would help you point up the value of a training course in the proper handling of grievances for first line supervision.

Make it clear that your plan is not the only one that *could* be employed to fill the existing need. Point out the alternative proposals and briefly analyze their strong and weak points.

Now show how the advantages of your plan outweigh the other possibilities. This is the time to quote the ideas or statements of other people in the organization; try to make your selling points a composite of representative opinion. Get away from "I . . . I . . . I" by saying "John Smith, the General Foreman says so and such . . ." or "The Plant Manager said this . . ."

You have now stated your case. Give the group an opportunity to ask questions. Be sure that the facts are clear in the minds of all.

## GET PARTICIPATION

Now is the time to close your sale. Briefly review the present and long run values of your proposal. Summarize the manner in which you think obvious obstacles can be overcome. Then get as many people as possible in the group to participate in working out some positive action. The best way to do this is by asking questions which begin with WHAT? WHO? WHERE? WHEN? and HOW?

If you want Superintendent Ben Lindsay to start participating, ask him something like "Ben, what do you think you could do with this program in your Department?" If you've made your point, Ben will tell you. And as soon as he makes a public statement of what he could do, he is lining himself up in support of the proposal. If his response is negative, try the question on a more likely prospect.

By asking opinions and drawing out suggestions you begin to build up a background of solid support. At this stage, if one of the dissenters in the group comes up with a criticism, try turning his objection back to one of your supporters. The more people you can start thinking and speaking favorably about the program, the more likely your chance of success. So spend as much time and effort as possible in encouraging members of the group to suggest, to recommend, and in short, to begin to feel that this is *their* program. In actual fact, *your* program is not sold until the people who are to carry it out have had an opportunity to understand it, accept it, and adopt it as *their* program.

## GETTING STARTED

*Start some positive action as soon as possible.* Most likely you will not get your idea across in one discusson or one presentation. You can be sure that repetition will be necessary. However, you cannot afford to wait for full and complete acceptance if this is not immediately forthcoming.

The important thing is to get some positive action started as soon as possible. No matter what the point on which you get action, whether it be a minor detail or a major move, *get some positive action underway.* This might be further investigation of certain factors by specified individuals, it might be the installation of a pilot program, or observation of a similar program in another organization. Remember that the only way to reach a goal is to get started and keep moving.

Possibly the most critical step in the installation of any program is the selling job to the people who must carry it out. The best way to make the sale is to start at the top. A clear, effective sales presentation is best built around the interests of prospective customers for your proposal. If you prove that a real need for your program exists, and that your plan is better than alternatives, you will be well on your way to the sale. To ring up the cash, you must get the kind of participation that helps people to adopt *your* proposal as *their* program. When you get people to take action on that basis, you can figure that your selling job is a success.

# Simplified Incentives for Multiple Production

By W. DALE JONES

School of Industrial Engineering,
Georgia Institute of Technology

Typical multiple machine assignment.

***Establishing a factor to compensate operators for unavoidable idle time due to work limitations. The laws of probability provide a basis for evaluating machine interference when operators cannot coordinate running cycles.***

WITHOUT the proper tools, the task of providing consistently fair incentive rates for products manufactured in multiple can be a very time consuming undertaking on the part of the rate setting department. Aside from the age-old problem of quality variation, there are two obstacles constantly confronting the timestudy man when establishing incentive rates for products manufactured in multiple; machine interference (machine idleness resulting when a machine waits to be tended because the operator is tending another machine) and variation in assigned work loads.

It has been found through careful testing that a recently developed mathematical approach to the problem of machine interference[1] is highly satisfactory for a great variety of conditions of multiple machine assignment. This, in turn, has made it possible to provide a means of handling the problem of variable work loads and to develop a wage incentive plan designed to provide consistently fair and equitable incentive pay to the operator, regardless of the combinations of products manufactured and the size of the work load.

For rate setting purposes, multiple machine assignments may be divided into two classes; (1) assignments in which the operator is "over-assigned" so that, regardless of the operator's productive effort, there will always be at least one machine awaiting servicing and (2) assignments in which the total servicing requirements are limited to the extent that the operator experiences a significant amount of unavoidable idle time. The problem of wage incentive payment for assignments falling in the first category should not be difficult; by basing the incentive rates on normal servicing time and neglecting automatic run time, the operator's earnings for a given assignment can be figured by multiplying the totals of the various products manufactured by their respective rates. Unfortunately for the rate setter, however, it is seldom economically feasible to over-assign the operator; it is generally better to minimize machine interference idleness by limiting the operator's work load to the point that he spends part of the time unavoidably idle, in readiness for servicing requirements. It therefore follows that the operator's unavoidable idle time, that may vary widely from one assignment to another, must be fairly compensated for if his incentive pay is to be consistently equitable.

## THE MULTIPLE MACHINE WAGE INCENTIVE PLAN

The operation of the multiple machine wage incentive plan presented in this article is simple. To illustrate, the incentive rate and the "load" for a given product might be .251 hr./1000: 16.4%, the .251 hr./1000 rate representing normal servicing, time and relaxation or fatigue time and the 16.4% load, denoting the percentage of overall time the operator would be engaged in servicing the machine on which the product is to be manufactured, if the machine were individually tended with normal productive effort. In figuring the operator's earnings for a given assignment, the pay clerk first multiplies the totals of the various products manufactured by their respective rates, adds the individual product earnings and divides by one thousand. This represents the operator's total earned time during working time. The pay clerk then determines the total normal work load for the assignment by adding the individual "loads" of the products manufactured in the assignment. He then refers to Figure 3 to determine what factor, if any, should be applied to the operator's earned time to compensate him for his unavoidable idle time due to work load limitations. The operator's total pay is then determined by multiplying his total earned time by the appropriate factor from Figure 3, and then by the basic pay rate for the job.

## UNAVOIDABLE IDLE TIME

The operator's unavoidable idle time, as used in connection with the multiple machine wage incentive plan, might be simply described as the time during which the operator is caught up on all servicing and necessary incidental du-

[1] W. D. Jones, "A Simple Way to Figure Machine Downtime", *Factory Management and Maintenance* Vol. 104, No. 10, 118-21 (1946). This article presents a more involved approach to the problem of machine interference than the one described herein. However, both mathematical methods yield identical results for a given set of conditions.

| No. Machs. Tended By One Operator | TOTAL NORMAL WORK LOAD (Percent) | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 | 130 | 135 | 140 | 145 | 150 |
| 4 - 10 | 60 | 56 | 52 | 48 | 44 | 40 | 37 | 33 | 30 | 27 | 24 | 21 | 18 | 16 | 13 | 10 | 8 | 7 | 5 | 3 | 2 |
| 11 - 20 | 60 | 56 | 52 | 48 | 43 | 40 | 37 | 33 | 29 | 26 | 23 | 19 | 16 | 14 | 11 | 8 | 6 | 4 | 2 | 1 | |
| 21 - 50 | 60 | 56 | 52 | 48 | 43 | 39 | 36 | 32 | 29 | 25 | 22 | 18 | 15 | 12 | 9 | 6 | 4 | 2 | | | |
| 51 - 100 | 60 | 56 | 52 | 48 | 43 | 39 | 35 | 32 | 28 | 24 | 21 | 17 | 14 | 10 | 7 | 3 | 1 | | | | |
| 100 & Up | 60 | 56 | 52 | 48 | 43 | 39 | 35 | 31 | 27 | 23 | 19 | 15 | 11 | 8 | 3 | | | | | | |

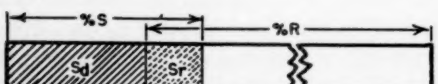
Figure 2. Average Percentage of Overall Time Operator Will be Unavoidably Idle, %U, Due to Work Load Limitations When Averaging 125% Productive Effort During Necessary Walking and Servicing and When Machine Running Cycles Cannot be Coordinated.

ties, and is waiting for work to do. Due to chance, these periods of idleness are usually unpredictable and of widely varying duration. It is generally conceded that whenever unavoidable idleness can be measured, it should be compensated for on the basis of 100% pay, or greater. Figures 2 and 3 have been prepared for the purpose of evaluating and granting 100% allowance for the operator's unavoidable idle time for various conditions. To insure complete understanding of Figures 2 and 3, the formula used in their construction will be derived.

Let $S_d$ = the "external" servicing time per unit of product, i.e., that done when the machine is non-productive.

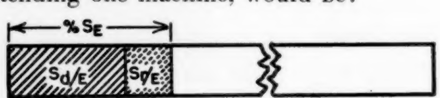
Let $S_r$ = the "internal" servicing time per unit of product, i.e., that done while the machine is producing. The terms $S_d$ and $S_r$ represent normal (100%) servicing time and on-the-job relax time, artificially assuming the machine upon which the product is to be produced is individually tended from a point involving average walking necessary when all machines in an assignment are tended together.

Let R = the running time per unit of product. Then %S, the percentage normal servicing time to overall time when one operator tends one machine can be expressed as:




$$\%S = \frac{S_d + S_r}{S_d + R}$$

Let E = the operator's average productive effort, expressed decimally (100%=1.00), during servicing duties. Then $\%S_E$, the actual percentage servicing time to overall time when one operator exerts E productive effort when tending one machine, would be:

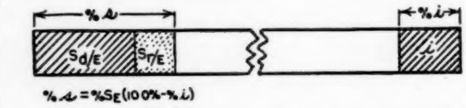



$$\%S_E = \frac{\%S/E}{\%S/E + (100\% - \%S)}$$

Let n = the number of machines tended by one operator.

When one operator tends n machines, machine interference becomes a factor in the operating disposition of each machine. Let %i = the average percentage of overall time each machine will be non-productive due to machine interference when one operator tends n machines, each requiring an average of $\%S_E$ percentage servicing time to overall time.

Then %s, the actual percentage servicing time per machine to overall time when one operator exerts E productive effort in tending n machines can be described as:




$$\%s = \%S_E(100\% - \%i)$$

where (100% − %i) is expressed decimally.

Finally, %U, the percentage of overall time the operator will be unavoidably idle when performing the servicing duties with E productive effort in tending n machines can be expressed as:

$$\%U = 100\% - n\ \%S_E(100\% - \%i)$$

where (100% − %i) is expressed decimally.

This formula was used in preparing Figure 2. Since the average operator on multiple machine assignments exerts approximately 125% productive effort during the servicing duties, an E of 1.25 was used in calculating the %U values of Figure 2. The %U values of Figure 2. The %U formula used in preparing Figure 2 therefore reduced to:

$$\%U = 100\% - n \frac{.8(\%S)}{.8(\%S) + (100\% - \%S)} (100\% - \%i)$$

The %S values were determined by dividing the "Total Normal Work Load (percent)" values in Figure 2 by the "No. Machs. Tended By One Operator" (or n) values in Figure 2. The %i values were secured from Figure 1 on the basis of the $\%S_E$ (or $\frac{.8(\%S)}{.8(\%S) + (1 - \%S)}$) values and the n values.

## MACHINE INTERFERENCE

Machine interference occurs when one or more machines are non-productive because, having become non-productive in need of attention, they remain idle while the operator or operators are tending other machines. The effects of


### *Acknowledgment*

*The writer wishes to acknowledge the assistance of Mr. D. B. McAuley of Stevenson and Kellog, Ltd., Management Engineers, for his assistance in extending the accompanying interference curves from groups of 20 machines to groups of 100 machines, and testing the reliability of same in the textile industry.*


| No. Machs. Tended By One Operator | TOTAL NORMAL WORK LOAD (Percent) | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 50 | 55 | 60 | 65 | 70 | 75 | 80 | 85 | 90 | 95 | 100 | 105 | 110 | 115 | 120 | 125 | 130 | 135 | 140 | 145 | 150 |
| 4 - 10 | 2.20 | 2.02 | 1.87 | 1.74 | 1.63 | 1.53 | 1.46 | 1.39 | 1.33 | 1.29 | 1.24 | 1.20 | 1.16 | 1.14 | 1.11 | 1.08 | 1.06 | 1.05 | 1.04 | 1.02 | 1.01 |
| 11 - 20 | 2.20 | 2.02 | 1.87 | 1.74 | 1.62 | 1.53 | 1.46 | 1.39 | 1.32 | 1.27 | 1.23 | 1.18 | 1.15 | 1.12 | 1.09 | 1.07 | 1.05 | 1.03 | 1.02 | 1.01 | |
| 21 - 50 | 2.20 | 2.02 | 1.87 | 1.74 | 1.62 | 1.52 | 1.45 | 1.38 | 1.32 | 1.26 | 1.22 | 1.17 | 1.14 | 1.10 | 1.08 | 1.05 | 1.03 | 1.01 | | | |
| 51 - 100 | 2.20 | 2.02 | 1.87 | 1.74 | 1.62 | 1.52 | 1.44 | 1.38 | 1.31 | 1.25 | 1.21 | 1.16 | 1.13 | 1.09 | 1.06 | 1.03 | 1.01 | | | | |
| 100 & Up | 2.20 | 2.02 | 1.87 | 1.74 | 1.62 | 1.52 | 1.44 | 1.37 | 1.30 | 1.24 | 1.19 | 1.14 | 1.10 | 1.05 | 1.03 | | | | | | |

NOTE: These factors were obtained from Figure 2; Factor = 1 + (%U ÷ Total Normal Work Load)

Figure 3. Factors to Apply to Operator's Total Earnings to Grant 100% Pay for Unavoidable Idle Time Experienced by Operator When Necessary Walking and Servicing Duties are Performed With An Average of 125% Productive Effort.

machine interference are clearly apparent in the weaving room. When, for instance, the operator is engaged in servicing a given loom, one or several looms may chance to shut down. There will be occasion when many looms are idle at the same time as well as occasions when all looms are producing simultaneously.

It has been found that the laws of probability provide a valid basis for evaluating machine interference idleness in cases where the running cycles of the various machines tended by one operator cannot be coordinated. The simple formula which makes use of the laws of probability and provides the basis of Figure 1 was derived as follows:

Let %d = the average percentage of time one of n machines in a multiple machine assignment is either non-productive or producing but being serviced internally by the operator.

The probability of a given machine producing while the operator is away from the machine is 100% — %d.

According to the laws of probability, the probability of all n machines producing simultaneously at a given moment and not needing the operator for internal servicing is $(100\% - \%d)^n$ where (100 — %d) is expressed decimally.[2]

Similarly, the probability of one or more machines being down or being internally serviced at a given moment is $1-(100\%-\%d)^n$ where (100—%d) is expressed decimally. It therefore follows that the average percentage servicing time per machine, %s, to overall time, expressed decimally, can be expressed as:

$$\%s = \frac{1 - (100\% - \%d)^n}{n}$$

where (100% — %d) is expressed decimally.

The above expression was used in constructing the accompanying interference curves of Figure 1. In preparing the curves, convenient %d values were chosen for various n values to compute %s values. Then, the corresponding percentage interference, %i, values were determined by substituting the %d and respective %s values in the expression %i = %d — %s.

In its most convenient form, as evidenced by Figure 1, the percentage servicing time per machine must be stated as $\%S_E$, i.e., on an individual machine attention basis. According to the previous definition of %s, $\%s = \%S_E\ (100\% - \%i)$ or $\%S_E = \%s/(100\% - \%i)$. To determine the $\%S_E$ values used in constructing the curves in Figure 1 it was therefore necessary to divide the various %s values by the corresponding (100% — %i) values.

The machine interference computer[3] was developed to test the reliability of the various published solutions to the machine interference problems, for groups of ten or less machines tended by one operator. The equipment, which provides for the creation and accurate measurement of machine interference, consists of three components: (1) a group of ten "machines" placed in a circle, (2) an "operator" moving about the circle, stopping and servicing machines which shut down, and (3) a timing and revolution counting apparatus which gives the basic data necessary for computing the servicing time, running time and interference time of the machines for each test.

To date, more than 100 thirty-minute

[3] W. D. Jones "Mathematical and Experimental Calculation of Machine Interference Time" *The Research Engineer*, Georgia Institute of Technology January, 1949. This publication can be secured without charge from the writer.

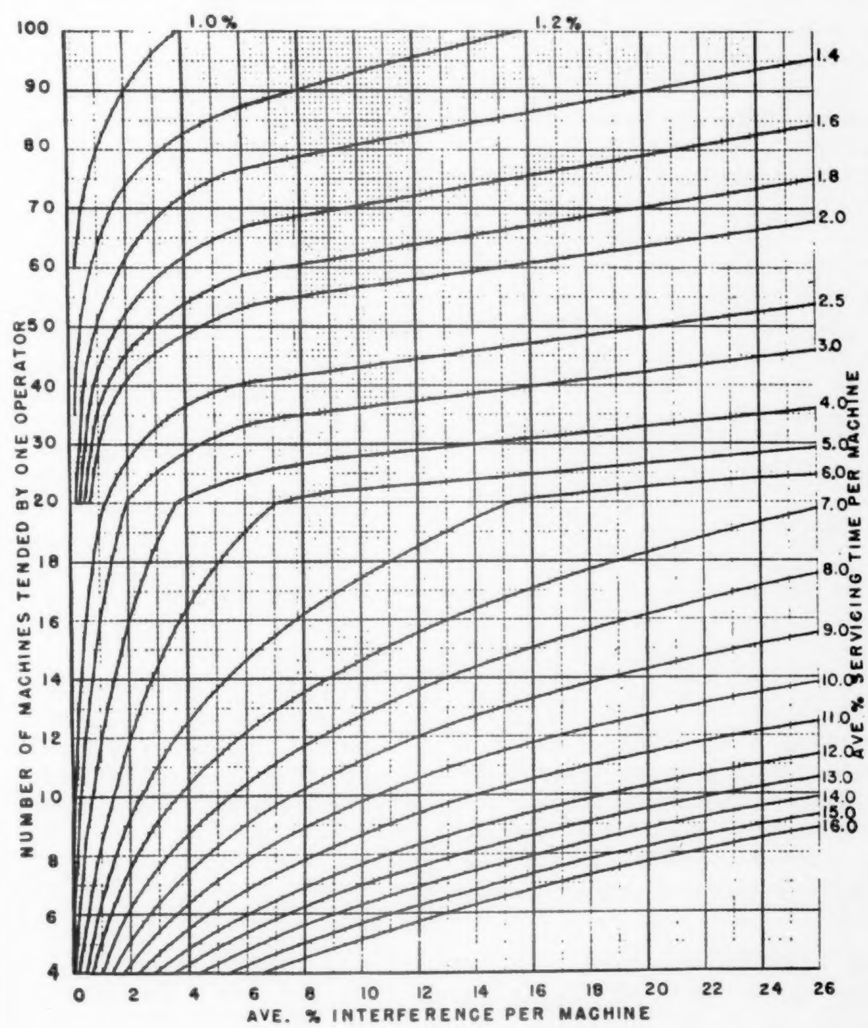


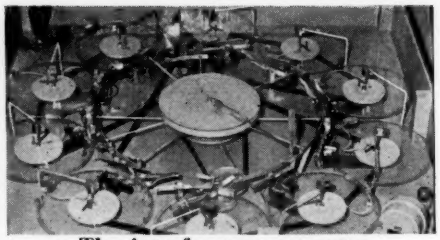

FIGURE 1. MACHINE INTERFERENCE VERSUS SERVICING TIME FOR GROUPS OF 4 TO 100 MACHINES

[2] This statement is exactly true only in cases where the %d for each machine in the group is the same. However, in cases where %d differs for individual machines in the group, the use of the average %d in (100% — %d)n introduces an insignificant error, according to the experiments to be described.

tests have been conducted with the interference computer, giving results representative of approximately 500 hours of multiple machine assignment in the plant. The tests involved conditions of uniformity where the servicing requirements per machine were the same, as well as non-uniform conditions where the servicing requirements per machine varied considerably. The test results were in very close agreement with the corresponding curve values of Figure 1 for groups of four thru ten machines, for both uniform and non-uniform servicing requirements. In no case did the actual interference resulting from a test differ from the corresponding curve value of Figure 1 by more than 3%; the average difference was .86%. The actual average interference per machine for all tests involving four thru ten machines was 12.0% and the average interference per machine for the conditions tested, determined through the use of Figure 1, was 12.4%. There were significant differences between the actual interference values and mathematically determined interference values for tests involving groups of two and three machines. This was apparently due to the fact that, since the shut-down possibility for each machine is not a matter of absolute chance, the running cycles of the machines in these limited assignments "dove-tailed," thereby causing less actual interference than that indicated by the interference curves. For this reason, the curves for these limited assignments are not included in Figure 1. The curves of assignments involving ten to one hundred machines have been tested for cone winding and weaving operations in several textile plants in the United States and Canada, and without exception, have been reported to be reliable. On the basis of the test results and reports from industry, Figure 1 is recommended for general usage in determining average interference idleness per machine for assignments involving one operator, in which the running cycles of the machines cannot be coordinated.

## CASE PROBLEM NO. 1

One operator is to be assigned ten machines. If tended individually with normal (100%) productive effort from a point involving average walking necessary when all ten machines are tended together, three machines would each re-



**The interference computer**

quire 14% normal servicing time to overall time, four would each require 8% normal servicing time and three would each require 20% normal servicing time. Determine the average percentage of overall time each of the ten machines will be non-productive due to machine interference when the operator averages 125% productive effort during servicing when tending the ten machines together. Also, determine the percentage of overall time the operator will be unavoidably idle due to work load limitations.

The total percentage normal work load for the assignment is $3 \times 14\% + 4 \times 8\% + 3 \times 20\%$ or 134%. The average percentage normal servicing time per machine is 134%/10 or 13.4%. If each machine were tended individually with 125% productive effort, however, the average actual percentage servicing time per machine to overall time would be $(13.4\%/1.25)/(13.4\%/1.25+86.6\%)$ or 11.0%. The average percentage of overall time each of the machines will be non-productive due to machine interference for the conditions in hand can be determined from Figure 1 as follows:

1. Locate 10 machines on the left vertical "Number of Machines Tended by One Operator" scale.
2. Project horizontally to the 11% "Ave. % Servicing Time Per Machine" curve.
3. At the point of intersection, drop vertically to the "Ave. % Interference Per Machine" scale; the answer for the conditions of this problem is 14% average interference per machine for each of the ten machines.

The operator's percentage unavoidable idle time, %U, can be determined by substituting in the previously developed formula:

$$\%U = 100\% - n\%S_E(100\% - \%i).$$

For the conditions of this problem,

$$U\% = 100\% - 10(11\%)(1.00 - .14) = 5.4\%.$$

## CASE PROBLEM NO. 2

The wage incentive rates for four products and the methods of computing same are shown in the box below.

Determine the operator's unavoidable idle time, %U, when tending 3 machines producing A, 3 machines producing B and 5 machines producing D, when exerting (a) 125% productive effort during servicing, (b) 150% productive effort during servicing.

The total normal work load of the assignment on an individual attention basis is 3 machs. × 13.6% + 3 machs. × 16.4% + 5 machs. × 6.3% or 121.5%. The average normal percentage servicing time per machine, %S, for each of the 11 machines is 121.5%/11 or 11.05%. The average actual percentage servicing time per machine, if tended individually, $\%S_E$, when the operator's productive efficiency, E, during servicing is 125% (or 1.25) would be $(11.05\% / 1.25) / (11.05 / 1.25 + 88.95\%)$ or 9.05%. At a productive efficiency, E, of 150%, $\%S_E$ would be $(11.05\% / 1.50) / (11.05 / 1.50 + 88.95\%)$ or 7.65%. As previously developed, the operator's unavoidable idle time, $\%U = 100\% - n\ S_E(100\% - \%i)$. For 125% productive effort, $\%U = 100\% - 11(9.05\%)(100\% - 9.8\%)$ or 10.2% (note the agreement with Figure 2, which assumes the operator performs the servicing duties with 125% productive effort). For 150% productive effort, $\%U = 100\% - 11(7.65\%)(100\% - 6.0\%)$ or 20.9%.

**Problem No. 2, Typical Data**

| Prod. | ($S_D$) Norm. Down-time. Serv. Min./1000 | ($S_R$) Norm. Run. Time. Serv. Min./1000 | (R) Running Min./1000 | (%S) $\frac{S_d+S_r}{S_d+R}$ | Incen. Std. $\frac{S_d+S_r}{60 \text{ min.}}$ : %S |
|---|---|---|---|---|---|
| A | 11.20 | 3.58 | 97.6 | 13.6 | .246 hr./1000:13.6% |
| B | 11.83 | 3.24 | 80.1 | 16.4 | .251 hr./1000:16.4% |
| C | 8.04 | 2.46 | 84.0 | 11.4 | .175 hr./1000:11.4% |
| D | 4.91 | 1.14 | 90.8 | 6.3 | .101 hr./1000: 6.3% |

## CASE PROBLEM NO. 3

An operator who receives $1.00 per hour base pay produces the following products during eight hours:

| Product | Incentive Standard | No. Machs. | Normal Work Load | Output |
|---|---|---|---|---|
| A | .246 hr./1000:13.6% | 4 | 54.4% | 11,620 |
| B | .251 hr./1000:16.4% | 2 | 32.8% | 13,150 |
| C | .175 hr./1000:11.4% | 2 | 22.8% | 12,810 |
| Totals | | 8 | 110.0% | |

Determine the operator's earnings for the day, assuming the company's policy is to grant 100% base pay for unavoidable idle time, figured on the basis of 125% operator productive effort during servicing, as in Figures 2 and 3.

## SOLUTION

The operator's earnings during actual working time are $1.00/1000 (.246 × 11,620 + .251 × 13,150 + .175 × 12,810) or $8.38. Referring to Figure 2, the operator's unavoidable idle time, had he averaged 125% productive effort when servicing 8 machines having a total normal work load of 110%, would be 18%. Referring to Figure 3, the pay adjustment factor which, in effect, grants 100% base pay for 18% unavoidable idle time under these conditions is 1.16. The operator's total earnings for the day would therefore be $8.38 × 1.16 or $9.72. This represents an earning efficiency of 121%.

## MAKING THE TIME STUDY

The objective of the time study when establishing incentive rates for products to be covered by the wage incentive plan described herein is to determine the total normal necessary servicing time per unit, per thousand units, etc., for each product manufactured in the assignment time studied. The term "servicing time," as used here, is taken to mean fix time, necessary inspection time, and walking time.

*In making the study* the timestudy man should:

(1) Record the time spent and, whenever possible, the operator's rating, on all individual servicings (excluding walking) for each product. When the same product is run on machines having different running speeds and/or servicing requirements, treat each type of machine's product as a different product for rate setting purposes.

(2) Time and rate enough walking occasions during the study to be able to later establish the normal walking time per servicing occasion. By being relieved of timing all walking, the timestudy man will have additional time to spend on (1).

(3) Determine the number of units of each product manufactured during the period studied.

*In establishing the incentive rates* the timestudy man should:

(a) Determine the average normal walking time per servicing occasion by dividing the total of the normalized walking times by the number of normalized walking occasions totaled.

(b) Determine the total number of necessary servicing occasions during the period studied for each product.

(c) Determine the total normal walking time for each product for the period studied by multiplying (a) by (b).

(d) Determine the total necessary normal servicing time, including walking, for each product during the period studied, on the basis of (1) and (c).

(e) Determine the normal servicing time per unit, per thousand units, etc. by dividing the total production of each product during the period studied into the corresponding servicing times determined in (d). Add allowance for fatigue, personal and minor interruptions to arrive at standard time. Convert to hours per thousand units; this represents the product incentive rate.

(f) Determine the automatic running time per unit, per thousand units, etc. for each product.

(g) For each product, divide (a) by (e) + (f); this represents the product "load" which accompanies the incentive rate.

The multiple machine wage incentive plan presented herein has been designed to overcome the inequities resulting when fixed incentive rates are applied to situations where the operator's work load varies from one assignment to another. Up to the point of over-assignment the greater the operator's work load, the greater will be his earnings. Beyond the point of over-assignment, the operator's earning efficiency will be equal to his productive effort; in no case will the operator be penalized by having his assigned work load increased.

Although Figures 1, 2 and 3 apply to conditions where the running cycles of machines tended cannot be coordinated, the application of the multiple machine wage incentive plan is not restricted to these conditions; the expression $\%U = 100\% - n\,S_E(100\% - \%i)$ applies to all multiple machine assignments. In those situations where the running cycles of machines can be coordinated, resulting in a minimum of machine interference, Figure 1 and consequently Figures 2 and 3 will be invalid. However, once the interference values for these situations are determined, tables involving the same principles of Figures 2 and 3 but different interference values can be easily constructed.

Although it would be impractical to attempt to teach multiple machine operators the mathematical basis of Figure 3, the use of the table in computing incentive earnings should be taught to all. For a given assignment the operator should be able to determine his total normal work load on the basis of the number of machines running each product and the respective product "loads," and to then determine the proper unavoidable idle time pay adjustment factor from Figure 3, as a means of checking his total earnings for the assignment.

# The Management of Maintenance*

By **JOHN B. WHITLOCK**

General Maintenance Engineer
Armco Steel Corp.

***Modern production makes new demands and places new emphasis on maintenance. Organization, specialization, preventive plans, research, and training play vital parts in the new scheme.***

THE importance of maintenance and its place in the operation and management of a corporation has risen from a rather humble beginning to one of major magnitude during the past two decades. This rapid change in position has been brought about by man's desire to lessen the physical load of his fellow worker and to substitute for his place machinery that will perform most of the manual tasks. This substitution of machinery for manual labor has increased the maintenance problems in every industry where these substitutions have been made. No longer do we find ourselves with one rather general maintenance man to each group of thirty operating men, but instead we find that we have a ratio of one highly trained and skilled maintenance man to each group of ten operators.

This change in the emphasis on maintenance has naturally changed the type of an organization required together with a drastic revamping of the maintenance methods to be employed. No longer can the maintenance man be expected to be the jack of all trades who can operate a lathe or repair a motor with equal skill. He must be a specialist; a man who is trained along one definite line and who is considered an expert in his field. No longer are the efficient breakdown repair methods, as employed in the past, capable of keeping an industry or process in operation but in their stead a system of preventive maintenance must be employed where potential failures are detected before they occur and immediate corrective steps taken.

## FUNCTIONAL GROUPS

This new type of organization must be designed then to meet the requirements necessary to minimize operating delays in a section and to maintain the equipment with a minimum expenditure of moneys. We have found that the best method of organization to employ in meeting these requirements is to provide an organization whose responsibilities are divided into three groups.

1. Field or Assigned Group.
2. Shops or Trade Group.
3. Power Group.

The functions of this Field or Assigned Group — as the name signified — are confined to the routine maintenance of a department or area. The groups are kept compact and their duties pointed towards preventive maintenance only. Each group in a department is headed by a foreman who has a responsible leader supervising the crews on each turn. The assigned maintenance foreman from all of the areas or departments report in turn to an Assistant Maintenance Superintendent who is responsible to the Division Maintenance Superintendent for the actual assigned maintenance of the division.

The Shops or Trade Group embodies all of the various tradesmen in the shop group that includes all types of trades such as Pipe, Carpenter, Tin, Machine Shop, Forge, Welding, Structural, Rigger and Locomotive Repair. Each one of these shops is supervised by a Foreman and manned by a sufficient number of craftsmen to meet the demand for their services placed upon them by the Division. These Shop Group Foremen are supervised by an Assistant Maintenance Superintendent in charge of Shops who reports direct to the Division Maintenance Superintendent, and is held responsible by the Superintendent for the operation of the Shop Group.

The responsibilities of the group known as the Power Department are centered in the production and distribution of such elements as steam, water, compressed air and electric power. Their responsibilities also cover the operation and maintenance of all of the prime mover substations where the major drives of all important operating units are housed. This phase of their work naturally covers the supervision of the substation attendants together with the substation maintenance crew.

## ORGANIZATION FOR EFFECTIVENESS

In addition to the generation, distribution and utilization of all of the various elements, the Power section is assigned two additional groups — the Test Department and the Electric Construction section. The Test Department, as the name implies, covers the testing for the efficient utilization of all of the elements; it supervises and maintains all of the metering equipment of the division and in most divisions it supervises and maintains all communication equipment. This department, properly staffed and equipped, is one that can save large sums of money in the form of efficient element utilization if the importance of their function is emphasized by management thru the supervision of the Power Department. The Electrical Construction Department is charged with the responsibility of making the installation of all new electrical equipment and controls together with the construction of all electrical distribution systems. Their work is closely

*Adapted from a paper presented at the A.S.M.E. and S.A.M. Conference on Plant Maintenance, Jan. 16-19, 1950.

united with that of the Electrical Engineering Department as it is through this department that all electrical construction work is channeled or is originated.

In each one of these various sections of the Power Department a foreman is assigned to direct and to manage the crews necessary to complete the task at hand. These foremen are supervised by an Assistant Superintendent of Power who in turn reports to the Division Maintenance Department Superintendent.

So in a division, we have the three groups staffed with a sufficient number of foremen and supervised by an Assistant Superintendent of Maintenance. These three Assistant Superintendents of Maintenance are directed by the Division Superintendent of Maintenance who gives general supervision to all sections of his department.

Each Division Maintenance Superintendent reports to the General Superintendent of his own Division and is solely responsible to him for the maintenance of the Division. The Maintenance Superintendent is also charged with the responsibility of working closely with the Operating Personnel and to do all possible to have his organization closely allied with operations and its personnel.

Obviously, an industry with many scattered plants must rely upon some central agency to formulate a unified program of maintenance and to aid in the execution of such a program. An organization designed to meet such a demand and composed of a General Engineer who is aided in the work by a group of specialists answers this need in our company. These specialists cover the fields of Lubrication, Material Application and Research and Prime Mover Inspection. This group reports directly to the Office of the Vice President in Charge of Operation and is responsible for the execution of a sound maintenance program to produce a minimum of maintenance delay for a minimum expenditure of money.

## PREVENTIVE MEASURES AS INSURANCE

The program of maintenance that we have found most successful has as its keystone Preventive Maintenance. Such a program is centered around careful inspection made by capable inspectors and is divided into two sections. One, routine daily inspection of operating equipment and two, regular interval inspection of prime movers. This program may be defined as one which directs the inspection of equipment at regular intervals and seeks to create a repair program utilizing the results of these inspections as a guide to the repairs to be made. Such a program properly executed prevents failures of equipment in service and aids materially in retarding the rate of depreciation. The interval of inspection is chosen as a result of experience and is generally based upon the character of the equipment; the service conditions to which it is subjected; and the importance of its function in the production process.

Preventive Maintenance expense may, in some respects, be regarded in the same light as insurance premiums although their functions are different.

In order to accomplish the complete inspection of our equipment, an organization composed of an inspector assigned to each department or area has been provided together with a prime mover inspector assigned to the General Maintenance Staff. The departmental or area inspector inspects the equipment in his section and reports his finding to the departmental or area foreman. This foreman then plans his work schedules based primarily upon the conditions determined by the inspector. The prime mover inspector inspects the prime movers in all divisions at regular and specified intervals and reports his findings to the Division Management. This Division Management then assigns the work load resulting from this inspection to the crews involved and follows the work through to completion.

The next part of a well rounded maintenance program must recognize the importance of material applications as material costs represent at least 60% of the total maintenance dollar. This material betterment program must first stem from someone in the organization asking themselves why the material application of a piece of equipment failed and after this answer has been determined, doing something to effect its correction or betterment. A careful analysis of material failures will produce an answer which will generally fall in one of several groups.

1. Faulty design.
2. Faulty manufacture.
3. Faulty material.
4. Overloading.

After the reason for the failure has been established, the corrective answer can generally be found. The answer may be found in a redesign of the section; it may be found in the care and precision with which the part was made, or it may be found in the type or grade of material used. The solution to the problem of material failure in any one of these groupings rests in the hands of the engineer or maintenance supervisor. If a successful preventive maintenance program is to be executed, he must take every possible step to improve conditions creating failures. The last group of material failures are those resulting from abuse or overloading of equipment. These sometimes present difficulties in solution. However, if the operating supervisor and the maintenance supervisor practice close cooperation — this class of failure can too be eliminated.

## LONG RANGE MATERIAL RESEARCH

We have found that our program of material research is producing highly beneficial results. The procedure generally employed incorporates the following steps. After the question "Why" has been answered and a material problem created, the problem is assigned to the material engineer. From his knowledge or experience of materials, an answer may be drawn. If such an answer is not available, the problem is then presented to the Research Laboratory where a research cover is taken and a complete investigation made. Many times the answer may be found in a study of the engineering drawings and with the aid of the engineering department a redesign is made.

In our opinion the material application part of our Maintenance program is one of the utmost importance. The answering of the question "Why" coupled with a sound research or engineering study is capable of producing many miracles in the maintenance of a division.

Such a program of material research produces a large volume of valuable information concerning the characteristics of materials under operating conditions. In order to make such informa-

tion available to all division engineering and maintenance departments, a Material Manual has been published that records all approved material applications to date. Such a manual is proving to be an invaluable tool in the hands of the maintenance supervisor or engineer and we find that through its use, the failures or delays resulting from faulty material applications have greatly decreased.

A third section of this preventive system of maintenance lies in the field of lubrication and its importance towards the successful operation of a piece of equipment. Before this day of exact maintenance, lubrication was looked upon as a job to be done by the lowest employee in maintenance in a manner suited to the whims and fancies of this particular employee. No particular thought went into the type or grade of lubricant used beyond the recommendation of a salesman of lubricants. No thought was given to the frequency of lubrication or the amount to be used in each dosage and even less that was given to the method of application.

These methods of lubrication — while costly — served in a moderately satisfactory manner for the lubrication of equipment designed to operate with tolerances of 1/16". Today, we have no such equipment to operate as the tolerances of today's equipment are measured in thousands of an inch. Today the speed of operation is greatly increased and the loads to which equipment is subjected are far beyond the loads of yesterday.

All of these changes in equipment design have necessitated changes in the lubricant used and the methods of application employed. A skilled and trained technical supervisor must plan the lubricating program and he must specify the lubricant, the method of application, and the volume of each dosage at stipulated intervals. These duties we invest in a General Lubricating Engineer aided by a Lubricating Engineer in each division. The actual department supervision is carried out under the watchful eyes of our departmental maintenance inspectors who guide the work of the men assigned to the lubrication duties.

Such a program has produced very satisfactory results but only after the story of lubrication was told to all responsible supervisory personnel. This story was told thru the medium of training in formal classes where the General Lubricating Engineer and the Division Lubricating Engineer served as instructors and used a manual written by the General Lubricating Engineer to fit the needs of our particular industry.

Following the inauguration of such a program of lubrication, certain refinement has been found advisable — most notable of which is the routine periodic testing of the lubricants used in main drives and enclosed gear trains. The results of tests of this type, properly recorded, give to the engineer a clear picture of the happenings of a drive and tell him when it is necessary to take definite corrective steps. Another refinement has been found in the wise installation of automatic lubricating devices that have been engineered to meet the demand of the equipment in question. And a final refinement is a constant search for new and better lubricants in order to keep this lubricating program one that is always abreast of the times.

## TRAINING IN MAINTENANCE

Besides a program of material betterment and a program of efficient lubrication, we find that there remains a third and possibly the most important of all programs — Training. Training of the personnel of a maintenance group is not a simple task because such a program must embody the training of men or groups of men in all of the known crafts and it must also train all of the men in fundamental mechanics, physics, blueprint readings and basic mathematics.

Armco has a well organized training department which has planned such a program of training that is being successfully executed. They offer to the employee of maintenance a four year course in trade work together with one year courses in the basic sciences. Such work on the part of the employee is entirely voluntary, yet it is interesting to note that over seventy percent of all of the employees in a given maintenance division have taken such training and that the new maintenance employee is taking all courses available to him.

The solution of today's maintenance problems then, we believe, lies in —

First — An efficient, well organized crew of skilled employees.

Second — A program of Maintenance procedures based upon an intimate knowledge of the condition of the equipment resulting from a sound inspection system.

Third — A program of material application study that will embody a study of material failures together with a constant search for new and better materials.

Fourth — A program of controlled lubrication that employs the best in materials applied in the most efficient and carefully supervised methods.

Fifth — A sound personnel training program under trained leadership that offers courses to the maintenance employee in such a manner that he wants to take such courses because he realizes that the completion of the courses will prove to be stepping stones for him in his advancement in his chosen profession.

This program of maintenance has been presented to you with the full realization that it is one of perhaps many successful programs now in operation. The shortcomings of this program are many and thru a desire to overcome these shortcomings — we are making a constant search for new and better methods. Perhaps, thru the medium of this article, some thought provoking statements have been made which will aid us all in doing a better job of maintenance for our respective industries. After all our job of maintenance is one of preserving the equipment used to make the things of life you and I have learned to enjoy. The better we do our job, the more abundant these things will become.

Because of all of these changes in maintenance, maintenance supervisors must continually keep before them the fact that maintenance has taken an important place in every major industry and that its management, in most cases, presents far greater problems than those found in other operating sections. Maintenance is growing rapidly and with this rapid growth we have a greater responsibility than ever before in the fulfillment of our duties. We must employ every tool at our disposal and attract to our work the finest of trained personnel. With all of this growth, we will derive greater pride in our work and greater satisfaction in our daily accomplishments.

# Time Study Research

## Part I — Rating

By M. E. MUNDEL

Professor of Industrial Engineering,
Purdue University

***Dissecting the elements of "pace" and "effort" to construct a rational, universal basis for determining comparative "job difficulty." Dr. Mundel develops the background for a secondary adjustment in the rating process.***

THE area of controversy in stop watch time study concerns the adjustments made to observed values in order to produce a standard. This is the first of a series of articles dealing with information regarding these adjustments which is presently available as a result of research conducted at the Purdue Motion and Time Study Laboratory and concerns the first adjustment made by *rating.*

An industrial time standard is usually taken to mean the amount of time that will be required to perform a unit of work, using a given method under given conditions by a worker possessing a specified amount of skill, aptitude and familiarity with the job, when working at a pace that will produce a specified physical effect upon him during a work period. The definite adjectives substituted for each use of the word *specified* in the above definition may vary from plant to plant but the essential similarities of the concepts remain. The problem of deducing a standard time of relative reliability from data obtained from the performance of a single actual operator is one of the most difficult in the whole field of motion and time study.

The particular operator studied on any one job may (a) fortuitously meet all of the requirements of the standard of measurement although one might well ask, "How will this be ascertained," or (b) the operator, when being studied, may not meet all of the requirements of the standard of measurement deviating above or below the requirements. It is obvious that, in most cases statement (b) will hold, with the operator observed neither of the type specified by the definition of standard, nor working at the pace defined as standard. The question is, how to compare the type and pace of the operator to that called for by standard and, if that which is observed deviates from standard, how to evaluate the direction and magnitude of the effect of the deviation from standard upon the time taken per unit; also, how to reduce this evaluation to a mathematical value that will allow the correcting of the time values actually obtained, so as to determine the standard time. This is the problem of rating.

### STATISTICS AND JUDGMENT

Many time study rating procedures have been proposed. These procedures can be divided into two main groups; first, those that are purely mathematical and second, those involving judgment. The mathematical methods propose to analyse statistically the distribution of operator times and to thus obtain a rating or correction factor. However, there are so many variables affecting these times that the mathematical sorting out of the effect of the operator's skill, aptitude, pace, exertion, capriciousness, and so forth, from the normal job variation has never successfully been done. Even if this were possible, no mathematical reference point exists from which to measure the residual variation. The only reference point usable would be the standard time and if this were known there would be no reason for the time study.

Rating systems involving systematic judgment have been in wide use with varying degrees of success depending on the inherent reasonableness of the procedures, the ability of the timestudy men who use them, and the plant attitude toward standards. This last is important. Many standard times in plants function well, even though they are incorrect, because the workers have learned that it is advantageous to have them function as if they were correct. The workers may vary their exertion on the different jobs, to produce, at all times, in some relatively fixed relationship to standard, thus covering up time study inconsistencies. They may complain sufficiently on the standards which are difficult to achieve so that these standards are revised, and restrict their output on the easy ones so that the inequity there is undisclosed. The men may even set up a system such that a consistent differential is maintained between individuals.

Such practices, abetted by past rate cutting, are sufficiently widespread so that many of the poorly conceived systems of rating or leveling often appear to be functioning properly.[1] Almost inevitably, in such cases, costs become out of line with profitable operation, or labor unrest develops. Certainly, the relationship between management and labor is deleteriously affected and morale suffers. Good labor relations are hard to build when one group feels it must continually deceive the other.

Consistency of the standards is the main requirement. Above all else, standards used to set quotas for human performance within a single plant must be alike in possibility of attainment. Accuracy, in relation to some fixed definition of standard, is also necessary. If judgment comes into rating, as at present it

(*See page 16 for all references to Bibliography*)

appears it must, it needs some fixed reference point to allow continual checking and comparison.

Of widespread use are the so-called "effort" rating plans. These involve the timestudy observer's comparing the "effort" exerted by the operator in performing the job, as reflected in pace, rapidity or tempo of performance, to the range of effort, in terms of performance, possible on the particular job, and expressing the result as a per cent of standard. The obtained time is multiplied by this per cent to obtain the standard time. Allowances are then usually added to the job for personal time, tool maintenance, fatigue and so forth. (It is to be noted that the use of a fatigue allowance, when the rating is supposed to adjust to a reasonable pace for that job, is primarily an admission that the rating was incorrect.) However, for efficient use, this method requires that the timestudy man, if he is to have any sound basis for his judgment, be familiar with the visible appearance of the steps in the range of effort, as reflected in pace, on each job he studies.

In a shop where most jobs are relatively similar in nature, (and this can be the case) this may well be feasible, but where a variety of jobs are encountered, this method of rating places a tremendous burden on the timestudy man and his consistency may well be questionable. Where incentive plans are in use, such procedures have given rise to a most peculiar situation. Management and labor, especially organized labor, may bargain for a suitable wage rate and for a statement defining standard performance. In many cases where labor is highly organized such negotiations may be rather extended. When all of this is done, the medium of exchange, the amount of work expected per hour for the agreed base wage, is still unsettled and is subject to the daily decision of the timestudy man who compares the pace he observes to *his concept of adequate performance on each job*. This is the essence of the conventional procedure.

From the viewpoint of the timestudy engineer this is a monstrous responsibility; from the viewpoint of management, the results may be very variable; from the viewpoint of labor, this may largely negate the results of their protracted bargaining. Certainly it is a situation which may easily give rise to grievances for all three groups. It is a small wonder that many time study systems have been proposed in the constant effort to reduce the variables or improve the judgment in the time study situation. It is unfortunate that some of these are sometimes intended to "confuse if they cannot explain" and it is also unfortunate that in some cases some of the three parties involved are neither open-minded about new proposals, nor apparently educationally equipped to evaluate them.

## CONTROLLING JUDGMENT

Standard times are used for scheduling, costing, quota setting, line balancing, departmental balancing as well as frequently being a basis for wage incentives. Some of these uses are so vital to the operation of a plant that the necessary data must be obtained in some fashion. This may mean merely informal quotas set by supervision altho this is even more variable than formal time study. At the present time no reliable means of interpreting time study data without recourse to judgment is known. Consequently we must face the following:

1. We need time studies.
2. Judgment enters into them.
3. They may contain certain questionably controlled variables.

Therefore it would appear reasonable that we attempt to reduce and control the judgment as much as possible, continually evaluate our results realizing their occasional fallibility, and attempt to apply the resulting standards intelligently.

The research data and the subsequent design of a reasonably adequate time study system which is later detailed in this and the following articles stem from a long series of experiments made in an attempt to resolve the problem posed in the preceding discussion. Certain assumptions and definitions were implicit in the research and these are listed in the following seven items.

1. Rating is relating observed performance to standard by means of judgment.

2. The judgment, to be of real significance should be on some observable, demonstrable basis. The judgment should be of such a nature that the process is explainable by other than mere recourse to the old dodge of "based on experience." The basis must be concrete so that which is being judged and the standard of reference is the same for all who may make the judgment. This further implies that the basis should also be such that real agreement is possible between labor and management on, at least, the measuring unit involved, or in other words, the concept of adequate performance. Whether unions are involved or not, it is likely that any group of workers will cooperate more fully if they understand the procedure of rating time studies, provided that the procedure is sound.

3. The judgment made must involve the evaluation of the observed performance, as compared to the definition of standard performance, so as to permit the computation of the standard for performance. The actual pace of performance observed must be understood to be a function of the skill, familiarity with work, aptitude for the work and exertion at the work of the operator, but these variables are hardly separately identifiable.

4. The operator's *skill* determines how rapidly he may do the job properly, less skill showing up in a slower potential maximum pace, more skill in a faster potential maximum pace, provided that the method remains constant. Skill is taken to mean proficiency at following a given muscular pattern. Pace is taken to mean rate of muscular activity. With a given method, skill may be reflected in pace. If the worker does not possess sufficient skill to perform the job in the proper manner, even at a slow pace, then the job cannot yet be time studied. However, in most cases, even partially trained people can perform a job in a prescribed manner, if allowed to work at a suitable pace.

5. The operator's *aptitude* determines how fast a pace he can maintain, or how long a period it takes him to acquire the skill required for a rapid pace. Other things being equal, poor aptitude permits but a slow pace, provided that the proper method is followed, and high aptitude permits a fast pace. Hence, both aspects of aptitude are also reflected in pace.

6. Familiarity refers to the exposure of the operator to opportunity to utilize his aptitude to acquire skill and affects potential maximum pace.

7. The *exertion* of a given operator is a function of two items: the difficulty of the job and the pace. Hence exertion, which determines the physical effect of the work upon the operator, is also reflected in pace.

## TWO BASIC FACTORS

Consequently, it may be seen that the evaluation or rating of performance may be reduced to a judgment of not more than two items, (A) pace and (B) job difficulty. In the typical time study procedure the timestudy observer first judges B (job difficulty) in order to form a concept of adequate performance for an operator of standardized characteristics on the job being studied and then judges A (pace) of the observed operator by comparing the performance he observes to this concept. The first formal study was designed to appraise the success with which experienced timestudy observers made such evaluations.

A study by A. J. Keim[2] showed that a trained group of timestudy engineers (approximately 50) rating films of 57 performances at different paces, using this conventional approach, made 46 per cent of their ratings with less than $\pm 10$ per cent error and 54 per cent with more than $\pm 10$ per cent error. A 10 per cent error was defined as a rating in error by 10 per cent of the value which should have been assigned. A pace of 75 (100 being standard) could thus be rated within $\pm 7.5$ per cent and a pace of 140 within $\pm 14$ per cent without exceeding the 10 per cent error as defined. The correct values to which to compare the individual ratings were obtained by using the group average, and first correcting for concept of standard.

Standard, as defined, may vary from plant to plant. Depending on both the definition and the scale, the typical operator with typical performance may be variously defined as 75 (60 base) or 120, 125, 130, or 150 etc., (100 base). The values actually assigned by the timestudy observers were corrected to the value they would have assigned had they all defined typical performance of the typical operator as 130. In this manner false conclusions arising from the use of different units were avoided and all ratings were made exactly comparable.

Next, the averages were adjusted for known relationships between certain of the 57 performances shown. The 57 performances were really pace variants of only 10 jobs, and thus it was possible to determine the consistency with which ratings were assigned to different paces of the same operation. The films used were selected such that the operator's pace and method remained constant within each series of cycles at each pace and the method remained constant from pace to pace. All films were of well trained industrial operators performing industrial operations and were filmed with the aid of cooperating industries. All tasks were light manual operations. Further experiments by Lehrer[3] with more carefully constructed films of a synthetic light manual job in which practically no method variation appeared from pace to pace and with extremely careful correction for concept of standard, indicated that with 31 timestudy engineers, all with at least one year's experience, observing 4 jobs or paces thereof, 19 per cent of their rating, made in this conventional fashion were within $\pm 5$ per cent, 42 per cent within $\pm 10$ per cent and 58 per cent exceeded $\pm 10$ per cent error.

Lehrer's motion pictures were made of a carefully selected laboratory operator, who scored high on a finger dexterity test and who was given, prior to the filming, an extensive, paid training period. This may also be taken, in view of Keim's data, to indicate that similar results are obtained when timestudy engineers rate real or synthetic operations; provided the paces are similar to industrial paces. Keim's data also indicated that the error increased as the pace departed from the typical range.

The one question immediately raised by these data is, "What is the effect of using motion pictures to show the operation instead of live operations?" was investigated at another Purdue work session. With the cooperation of one Indiana concern films were made of light manual and hand operated machine operations at various paces and these films as well as the same operators actually working at their tasks at various paces were presented by L. Margolin for rating by a group of timestudy engineers. It was found that the ratings were more consistent and more accurate when made from motion pictures than when made from the actual performance.[4]

Consequently it may be assumed with reasonable reliability that the data presented by Keim and Lehrer are from at least a reasonably fair situation. However, it should be noted that in both Keim's and Lehrer's experiments the raters were not particularly familiar with the jobs being rated. Be that as it may, evidence will be presented later to show that even under such difficult circumstances other procedures may be used to greatly reduce the errors of judgment.

## QUESTION OF VALIDITY

While the accuracy reported in these experiments is surprising, considering the difficulty of the complex judgment involved, such results can easily give rise to extremely difficult situations and have led to such remarks as the following which can hardly be disregarded.

"Obviously, if after months of negotiations and possibly strikes at great financial sacrifice to both sides, a settlement has been reached involving a ten per cent change in the basic rates, neither management nor labor is prepared to sacrifice its respective rights to the blind operations of a technique of questionable accuracy.

"The use of a time study technique to set production standards whose demonstrated inaccuracy may exceed this percentage can become the source of much controversy. Naturally the demand by either side to monopolize the function arouses the suspicion of the other. Thus the solution to the basic problem of the validity of existing time study practice lies at the very heart of satisfactory industrial relations." [5]

We may easily see that typical time study procedures as outlined easily permit considerable error. More complex multi-factor conventional judgment rating systems commonly called levelling, have been shown to be equally undesirable.[6]

## SECONDARY ADJUSTMENT FOR JOB DIFFICULTY

As may be deduced from the preceding discussion, typical time study procedures wherein first job difficulty and then pace must be *judged*, (or wherein pace, the second judgment, is

sub-divided into several factors separately judged), do not appear to offer, for the most part, sufficient chance of reasonable accuracy to withstand close scrutiny or to provide adequate grounds for industrial peace.

What makes a reasonably reliable time study rating possible is, first of all, the fact that the difficulty of the job and its effect on pace does not need to be judged but may be reduced to objective terms, based on observable phenomena and experimental data obtained with these phenomena may be reduced to tabular form as a function of strength required, amount of body used, degree of dexterity etc., as will be discussed in detail in the next article. Thus the sole remaining phenomenon to be judged is pace, or rate of activity, or speed of movement. Although the desired rate of activity is defined in the definition of standard this is still subject, if left in this form, to subjective variation, but as will be seen later, this may also be set up in objective form so that the two items which the time study observer must compare can be set into concrete form and any number of observers may make a judgment between the two same items, performance and standard, without recourse to an imagined concept. As will also be shown later, this produces a remarkable increase in the reliability of the time standards. In short, what is being proposed is a two step rating procedure where the steps are in the reverse of the conventional order.[7]

1. Rating of pace against an objective pace standard which is the same for all jobs. In this rating no attention whatsoever is paid to job difficulty and its affect on pace, hence a single standard may be used instead of many mental concepts.
2. A secondary adjustment consisting of a percentage increment added to the values obtained in step one. This percentage increment is to be taken from experimentally determined tables of the effect of various observable factors which control the exertion required at a given pace.

As has been experimentally verified, (as will be shown later), such a procedure offers a vastly improved probability that time studies rated with this procedure will more consistently represent a single concept of standard than conventional procedures.

*Part II will appear in the July or August issue of* Advanced Management. *It contains additional details about the "exertion" adjustment described above.*

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# Current Sales Forecasting Procedures

By ROBERT D. HENDERSON[1]
Bucknell University

***Recent advances towards the goal of accurate scientific sales prediction reveal basic factors and the extent of their use. Results of a survey present a composite picture of management methods for estimating potential sales.***

QUANTITATIVE analysis is often necessary for success in any enterprise, particularly a business enterprise. Determination of the number of machines needed, the size of the labor force required, and the volume of raw materials necessary are of primary importance to successful production. The foundation of these estimates, however, is an accurate sales forecast.

The accurate sales forecast then is the basis around which all of the quantitative problems of industry revolve. It is imperative that this foundation be sound.

Any forecasting technique, must consider the problem of human behavior. It is this unpredictable element that has thus far prevented prognostication from becoming a more exact science. The challenge has been accepted and progress from a great many viewpoints is already in evidence.

The intent here is to analyze some of the most recent advances in the field and to survey the extent to which they are applied. It should be noted that in addition to the inescapable human factor, the complexities of the twentieth century have produced other complications. Each particular area of industry is confronted with its own idiosyncrasies. Each must determine the direct and indirect effects of competition, seasonal variations, governmental activity and the ever present business cycle.

The accurate sales forecast then, in substance, is a scientific prediction concerning the quantity of products that can be sold during a given future period. It must include examination and inclusion of several factors, not the least of which is the elusive human element.

## PROCEDURE EMPLOYED

To obtain an up-to-date picture of what actual methods are used in industry today, a survey was made of cooperative industrial organizations. Letters were sent to a variety of corporations picked at random with care being taken to guarantee a small sample from as great a diversification of industrial types as was possible.

The goal was to gain enough information to formulate a general pattern of industrial sales forecasting methods as found in actual practice. A 54 per cent response, which might be considered a fair sample, was received in answer to the inquiries. Only three of the returns disclosed no information. It is believed the replies gave an accurate picture, at least a general sense, of what each company used as its sales forecasting method. They were sincere, and though some were not as specific as others, seem to give all of the necessary information.

## COMPANY PROCEDURES AND POLICIES

Without exception all companies submitting usable replies employed a multiple index method of forecasting sales. The indices or factors used combined to form a composite picture of potential sales. One company has been using their method for a period of forty years and has found it to be highly successful; and another company has achieved similar results from their method for a period of twenty-five years. In none of the cooperating firms was the principle of pure guesswork or the "mental giant" calculation used exclusively.

There were several companies who referred to the knowledge of executive heads or sales heads as one of the important factors in sales forecasting. In these industries, executive knowledge was listed as being based on past experience and as being combined with a variety of other factors. This so called sales "guesstimate" did not stand alone as the deciding factor but was used rather as a coordinator after the assembly of all of the other factors, their evaluation, and their influence has been given due consideration. It is an established fact that statistics by themselves are of limited value and certainly cannot make the decisions necessary for effective operation of any type of plan. The knowledge of the executives of a business must be the basis for the final decisions pertinent to the use and evaluation of all available information.

The director of sales for one of the better known carpet firms, in discussing their method of sales forecasting, comments that

> "... First you must consider population by area. You have to arrive at the potential purchasing power of people, in that locality, on a per capita or family basis. You will have to divide your production into the various areas of your distribution and allocate a percentage of your production to a given area, in accordance with the population and their purchasing power. Also you must consider the purchasing power compared with earnings and spendable income. You would then have a volume potential index on which to base your operation

[1] *The author wishes to acknowledge the assistance of R. E. Brown and C. E. Cooke in conducting the research incorporated in this article.*

and, as mentioned above, you can do it on a basis of family or per capita. . . .The geographical situation of an area is very important, in relation to the type merchandise you are offering. . . . consider your ability to service and solicit in that area. . . All of these are important. Tie them all together and I think you will get your answer."

The seasonal factor in selling is emphasized by an official of a large magazine publishing firm who notes in his reply the belief,

> "Newsstand forecasting is based on experience for the issues over several preceding periods adjusted to the current trends. Seasonal fluctuations are considerable in these sales, common on all publications. There is a definite pattern for them. Usually newsstand sales hit peak on the February or March issues and recede to lows on the June or July issues. After that the trend is upward."

## BASIC FACTORS

In the sampling selected for this study, no two identical industries were used. This fact was taken into consideration when requests were sent out with the belief in mind that no two companies use identical forecasting methods, or even identical factors. Returns have borne out this contention, since a wide variety of general factors used in actual industrial forecasting were reported by the responding firms.

Over 67 per cent of the replying companies use both internal statistics and data compiled by outside sources. Of the remaining companies 25 per cent use data of their own exclusively, and over 7 per cent use data which is entirely supplied by outside statisticians. It was further discovered that about one-third of the companies use in their forecasting procedure some form of government statistics, which, if the Hoover commission's findings are correct, would indicate some fallacy in their system's accuracy.

It is realized that it is almost impossible for some of these so-called factors to be set up without some degree of over-lapping. An attempt has been made to prevent this so far as possible, and it is noted from a review of the sample that nineteen general factors were mentioned by the replying companies. The greatest number of these factors considered in the sales forecast of any one company was eleven, the smallest number was three. The other companies use a number lying between these, the average for the entire group being 6.59, or almost seven, factors in forecasting considered by the average industrial concern.

Figure 1 shows that a large percentage of industries today consider the historical background of their products to be the most important factor. This long time trend gives them a review of the growth of their sales volume from which it is possible to determine, with a fair degree of accuracy, what the expected increase in sales for a certain period will be. It is also a determining factor in ascertaining the normal expected sales volume for the particular industry. One of the companies using this factor was a large steel company and their reply included information which would indicate that similar methods are used by others in the steel industry as members of the American Iron and Steel Institute.

The second factor given great weight by a large percentage of these companies is seasonal variations. In most cases the companies have set up a seasonal index for each particular product which gives them the proper seasonal variations in order to arrive at the estimated sales for each period. This short term or secular fluctuation in sales can be controlled by the company requiring weekly reports from sales divisions. In some cases, customer reports are used which keep the records up to date and allow adjustment for variations from the estimated sales volume by special advertising or sales promotion efforts. One company states that there is a definite pattern for these seasonal fluctuations and that, in their particular case, the variation is considerable. Where such a pattern is established the company can more readily deal with the situation and in this case, the company has been using successfully their forecasting methods for a period of more than twenty-five years.

The third most widely used factor, the "Potential Market," is one of the more difficult factors to estimate. It is also one which may overlap several of the other factors such as consumer demand, population, geographical area, purchasing power, and competition. It is believed that whenever any method of sales forecasting is used some consideration must be given, to the potential market.

To show the effect of the potential market factor, it may be interesting to review an example of how it is used in one industry. This industry (baby foods) is faced with a complete turnover of customers approximately every two years. To determine their market potential, they use government birth statistics broken down into age groups. This is further broken down into areas to conform with sales territories. Then, on the basis of previous usage and brand acceptance, the consumption factor for

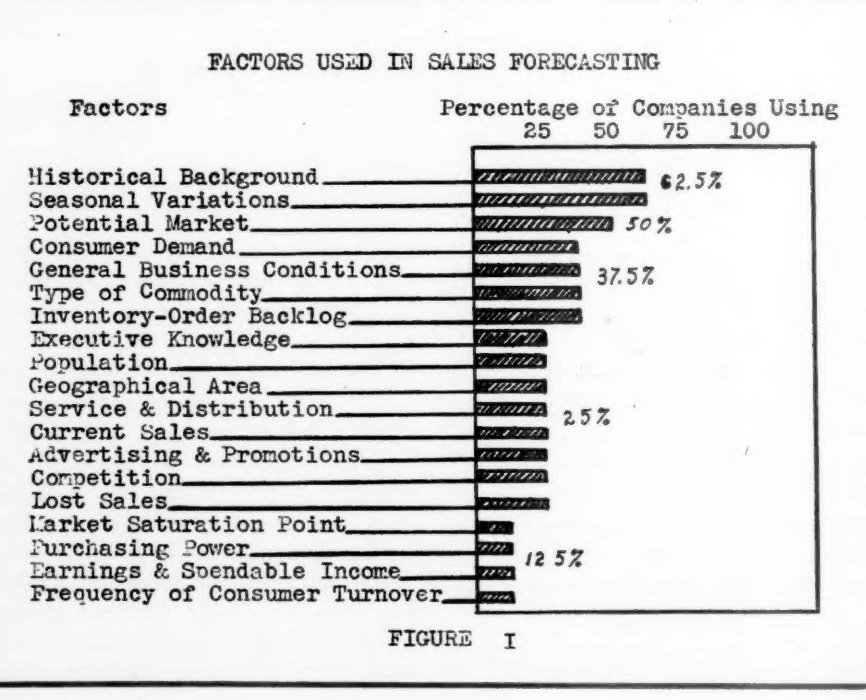


FIGURE I

the particular market can be determined.

This is merely a break-down of the influence of this one factor as used in a particular industry. This example is comparatively simple because of the ease by which statistics can be obtained, but it will give the reader some idea of the complexity of obtaining one factor in the forecasting of sales. This particular company uses no less than ten other factors in determining their sales forecast.

It is rather obvious that general business conditions will have their effect on almost any type of sales effort; therefore, it seems that most of the replying companies did not deem it necessary to mention this as a factor in determining a sales forecast.

The use of population figures, though they may well be important, were only specifically mentioned by a few companies and these used them in conjunction with other factors, such as in the example of baby foods. Population figures by themselves are not significant, but when they are combined with other factors such as geographical area, spendable income, and competition they help to make a composite picture of the potential market for which the forecast is being made.

In industries where there are backlogs of orders this factor must be considered in future sales forecasting. On the other side of the fence, current inventories in the production plant and also customer's inventories must be considered in forecasting sales particularly when the use of the sales budget for production and inventory budgets is contemplated.

The assistant Sales Manager of a prominent radio manufacturing corporation reports it is his firm's policy to

> " . . . assume that we are entitled to a certain percentage of the entire radio industry's business. Therefore, we gather together as much data as possible from R. M. A. (Radio Manufacturers' Association) figures, government reports, etc., to determine if it is reasonable for us to expect this certain percentage. *Sales Management* magazines are also referred to, which, if kept in record form, will present a guide as to what has happened in past years."

## FORECASTING PERIODS

There is much discussion concerning the frequency of forecasting sales and the amount and frequency of revising the forecasts to correct for trends and the various fluctuations which enter into such revisions.

Forecasts are made, depending on the company and type of commodity, usually for a period of from three months to a year or more. Then this forecast is broken down into shorter periods and the different variable factors are considered. To show how this might work, here is an example supplied by a prominent manufacturer of photographic equipment and supplies.

This company has found it helpful, over a period of forty years, to use a graphic method of measuring long time trends. They use a light line to indicate the seasonal fluctuations in monthly sales. A heavy black line is used to indicate a moving annual average eliminating seasonal variations. A third dashed line is curve fitted to measure the long term trend. They take into account, on such a graph, all of the factors entering into sales forecast.

After all of the factors affecting sales trend are considered, a line corrected for seasonal variation is entered on the graph. The company feels that it is desirable to forecast sales for at least one year; this is done by reading off the points for each month to arrive at annual estimates. Use is made of the thirteen period calendar, keeping sales and production records by four week periods, thirteen of which give the yearly forecast. Their seasonal index for the various products is computed by standard methods and is usually based on at least five years of past sales experience.

The steel industry uses two general types of forecasting; the long-term, or trend in demand, both for the individual company and for the industry as a whole, and the short term or secular fluctuations. Their long term forecast is based on material similar to the previous example. Their appraisal of the immediate future, usually three months to one year, is dependent partially on the long term outlook and secondly on the economic conditions expected for the forecasting period being considered. They prepare monthly a schedule for the next month and a summary of the outlook for subsequent months.

## BUSINESS BAROMETERS

Roger Babson[2] described external information as "fundamental statistics." This data, he continued, "relates to underlying conditions of the country and makes it possible to analyze demand, supply, money conditions, etc." It has been established that the intelligent application of facts and figures of this nature can have far more conclusive results than complete dependence upon internal reports.

There is little agreement as to what sources of this material offers the best results. Information may be obtained from the Federal Government, State and Municipal Departments, various private societies, organizations, bureaus, newspapers, magazines, printed reports, sales reports from wholesalers and retailers, export and import data, experimental campaigns in restricted territories, and a multitude of other sources.

Professor Brown[3] lists the following indices of external statistical information:

GENERAL

1. Harvard B. Curve
2. Annalist Index of Business Activity
3. Debits to Individual Accounts outside New York City
4. Electric Power Production
5. Freight Car Loadings
6. Value of Building Contracts Awarded

PRODUCTION

7. Index of Industrial Production, Federal Reserve Board
8. Index of Industrial Production-Standard Statistics Corporation
9. Index of Volume of Manufacture-Harvard Economic Society
10. Automobile Production
11. Pig Iron Production
12. Steel Ingot Production Activity (Weekly)
13. Steel Ingot Production (Monthly)

EMPLOYMENT AND WAGE PAYMENTS

14. Employment, Federal Reserve Board Index
15. Employment in Manufacturing Industries

DISTRIBUTION

16. Department Store Sales, Federal Reserve Board

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[2] *Business Barometers Used in the Management of Business and Investment of Money*, Babson, Roger W., Babson Statistical Service, Babson Park, Mass., 1929, pp. 15.

[3] *Problems in Business Statistics*, Brown, Theodore H., McGraw-Hill Inc., New York, 1931, pp. 196-198.

17. Sales of General Motors Cars to Users

PRICES

18. Bureau of Labor Statistics Index of Wholesale Commodity Prices
19. Fisher's Weekly Index of Wholesale Commodity Prices

MONEY AND SPECULATION

20. Open Market Interest Rates, 60-90 Day Commercial Paper
21. Call Money Rates
22. Stock Prices, Dow-Jones Index
23. Bond Prices, Dow-Jones Index

To this list of specific external sources of information should be added:

1. The Twentieth Century Fund Report
2. Roger Babson's Reports
3. The New York Times Reports
4. Services of the American Association of Newspaper Publishers

The purpose in collecting and publishing this material is to aid individual business men to make enlightened decisions. The general method is to evaluate certain transactions to determine their effect on general and/or specific business situations. The result is then translated into an index which when properly interpreted and combined with specific situations is indicative of basic and particular trends. The more inclusive of these studies have been constructed to properly weigh the effects of seasonal fluctuations and many other considerations.

A description of the Harvard "B" Curve may clarify the procedure somewhat. This index, a measure of general business activity, is based upon a combination of bank debits and commodity prices. Bank debits are taken from statistics compiled outside the New York City area and are adjusted for seasonal and bank holiday variations. The commodity facts are based upon the Bureau of Labor Statistics Index of Wholesale Prices. The factors are combined equally and expressed in terms of deviations above or below normal.

The result is a reliable, unprejudiced portrait which can be analyzed separately or combined with the internal considerations previously mentioned as a basis for accurate estimates. The Harvard Curve is published with an accompanying chart to facilitate interpretation.

## CONCLUSIONS

It was not the purpose, in assembling the material included in this report, to arrive at any solution to the ever present problem of deriving a sales forecasting method applicable to all general situations. No world shaking discoveries resulted. The object has been merely to present the possibilities in this field and methods in use.

It is clear that, almost without exception, and regardless of the type of industry, some method of scientific sales forecasting is necessary. This was true in all of the industries from which information was secured in completing this study.

It has also been found that the element of error in judgment, based on the very best statistics available, will never reach the stage where it can be completely eliminated. According to some findings, even the statistical element in forecasting is not always completely reliable. Thus, much dependence has been, is now, and probably always will be placed on the judgment of individuals or groups of individuals who from their experience and knowledge are able to use the facts available in the formulation of reasonably accurate sales forecasts. The human element is ever present here as in all other fields of endeavor.

# Fallacies in Job Evaluation

By DR. F. J. KNIGHT

Sessions Engineering Company

***"Factors" for evaluation undergo a candid analysis in the light of basic relationships. A thought provoking exposition of a personal point of view.***

**The opinions expressed in this article are those of the author. The editors do not necessarily agree with him. Comments on the ideas presented are welcomed. The most effective rebuttals will be published.**

JOB evaluation, as conducted in the vast majority of cases today, is a pious fraud. Its claims to scientific standing are false, and the majority of its practitioners are blindly engaged in unintelligent application for formulas to a problem the true nature of which they only dimly comprehend.

In evaluating a job, we are seeking to determine what it is worth; that is, its price. In identifying a wage rate as a price, I do not infer that a workman is to be treated as thoughtlessly as a sack of grain. He is a person, entitled not merely to hard justice, but to kindly and friendly consideration. Nevertheless, his wage rate is subject to the same forces as determine the price of a sack of grain, and relative supply and demand will have an inexorable influence in determining it.

The usual procedures of job evaluation give little or no direct attention to supply and demand. The influence of economic forces in the local market is only recognized in a general way when the wage schedule of the plant being studied is tied in with a schedule of average rates being paid by all plants in the community. This tie-in is at only a few points where standard or "key" jobs can be identified. Wage rates for all other jobs within the plant are then set by assuming some logical relationship between them and the "key" jobs. These relationships may be determined by various means, such as the "ranking" and "point" methods. Often an elaborate system of weighting of the factors considered in evaluation is resorted to in order to bring the theoretical rates into reasonably close conformity with the going rates in the plant and in the community.

## FLUCTUATION OF RELATIONSHIPS

The basic assumption underlying present-day job evaluation is that the value of a job is (or should be), proportional to the sacrifice a worker must make in order to qualify. This sacrifice is made in terms of gaining experience, education, and skill, and in assuming responsibility, enduring working conditions, and so forth. This idea parallels a primitive theory of value, according to which the prices of commodities in a freely competitive market will, in the long run, tend to become proportional to their costs of production.

Unfortunately, most job evaluation engineers have accepted this theory uncritically, without carefully examining its qualifications. This leads to a fallacious assumption that what would *tend* to occur in the long run *should* occur *now*. This, in turn, leads to the further fallacy that the proper relationship between jobs, once established, should remain static.

Such a view is unrealistic, and therefore unscientific. Actually, as economists eventually discovered, the phrase "in the long run" would better be rendered "in the never-never land." Like the North Star, the long run may be used as a guide post, but it is not a place at which we will ever arrive. And, as Lord Keynes so amusingly put it, "In the long run we are all dead."

Most practitioners of job evaluation seem unaware of this. Unwittingly, they are engaged in setting up pseudo-scientific schedules of the relative values of the various classes of labor. These schedules are commonly regarded as absolute and unchanging truth.

Employees, managements, and unions are assured that the measurements made in job evaluation are scientific and accurate, and that therefore any discrepancies between actual and evaluated rates prove that actual rates are wrong and ought to be corrected. Yet observation of the behavior of prices generally shows that the natural relationships of prices of various things are never constant for long, but fluctuate endlessly.

Although, in the long run, the price of a pound of butter may bear some relation to that of a bushel of corn, both having some relation to agricultural costs, the relative prices of butter and corn are always changing. This occurs despite efforts of the government by subsidies and so forth, to stabilize the prices of both. Should we then expect that the value of an hour of a foundry helper's time will always bear a fixed

relation to the value of the time of a machinist, or carpenter?

Any such assumption is wholly unscientific, and any system of job evaluation which is built upon it will in time come to grief.

## DANGER OF STRATIFICATION

The danger is greatest for large companies, because their contractual relations with employee unions are highly formalized in printed form, and departures therefrom may become exceedingly difficult to make. In such cases the reasonableness of the employers case may bear little weight as against the vested interest of employees in the status quo. Classic examples of this exist in railroading, where featherbedding is entrenched behind job definitions that were made to fit conditions of fifty years ago.

Rigid stratification of relative wage rates will lead to the same kind of trouble. Having once assigned "points" and "rankings" which are claimed to be scientific and absolute, an employer can scarcely later claim that any different schedule is in order. To do so would denounce the quality of the first evaluation, and this would surely undermine confidence in the principles of the "science" of job evaluation.

So much for what is wrong with present day job evaluation. What can we do to improve it? The only sound procedure is to eschew false principles, and to disdain oversimplification of the problem. Management, union officials, and employees must be shown the subject in its true nature.

This will not be easy. Many practitioners of the present routinized hokum will find they must secure more training and perspective to deal successfully with the complexities and intangible elements of a scientific approach to valuation. It will be found more difficult to explain the true situation to management and worker than it is to sell them a simple cure-all. One attraction of traditional job evaluation to many managements is that it purports to eliminate for always the bother of having to negotiate changes in the *relative* rating and pay of different jobs. The job of negotiation is simplified if only blanket raises or cuts need be considered. It will naturally disappoint managers to be told that the problem can't safely be side-stepped so easily.

## BASIS FOR EXCEPTIONS

Variation between actual market rates and the evaluator's calculated rate should not be automatically regarded as proof that the actual rate is wrong. For example, temporary scarcity of workers with particular skills should be openly admitted as legitimate justification for "out of line" rates. This should be followed in place of the common policy of either recommending the rate be "brought into line" or juggling the "weights" and "degrees" until the existing rate seems to be in line.

Careful examination of jobs, rates, and insofar as possible, statistics of supply and demand for various grades of workers, will be needed to do a scientific job. This is hard work, and requires more cooperation from outside firms than does the traditional study which is concentrated almost wholly on the company's own internal situation.

"Points," "weighting," and "ranking" need not be abandoned. They are often useful devices with which to draw comparisons, and with which to translate judgments into figures. But their function should be transitory. People should not be misled by the false impression of exactness and finality which a mathematical treatment often gives.

Getting down to facts will make the job evaluator's job tougher. But only by recognizing facts can we hope to arrive at true answers. Oversimplification to the point of pretending that problems don't exist can only create new problems.

If we are going to call it scientific management, let's be scientific!

# Reducing Costs in a Service Business

## Part II*

By WILLIAM J. BURNS and ROBERT B. SHAPIRO

Associated Business Consultants

***Details on definition of real income and method of incentive distribution. Expenses not controlled by employees do not influence this "Income Sharing Plan."***

THE exact percentages used are not recorded here in order to protect confidential information and in order to avoid the possibility of any reader being misled by attempting a cross-comparison with his own figures.

However, recorded here are the basic elements of the successful plan. First, in any reasonable period, the value of the services performed by employees and the payroll fall and rise together. And, second, the only money any agency can pay to the employees must come from the customer billing of the agency.

Net billing is defined as the difference between the total client billing and the cost to the agency of purchased advertising media such as space or radio time. Those things which the agency buys from outside sources such as layouts, proofs, special art work, etc., were recorded, defined and determined. The total of these agency expenses are deducted from the total "net" billing.

### SHARING THE "REAL INCOME"

The "Balance" — therefore, is the REAL INCOME of the agency or in reality, the sum of money which the employees' services have helped to create and in which they have a right to expect to share. And, share it they do. The predetermined percentage of the "Balance" as a lump sum is distributed among the employees bi-monthly as follows. 20% is set aside in a Reserve Account and the balance or 80% is immediately distributed to each employee in direct percentage to their regular wages or salary. Hence, the agency internal alignment of regular wage rate differentials due to different job values, is maintained. Employees are encouraged to use one-third of this 80% for payment into an available Retirement Plan. All but one has done so.

The following *hypothetical* example will exemplify the Plan

| | |
|---|---|
| Total Agency billing for *two* month period | $175,000 |
| Less cost of media | 145,000 |
| | $30,000 |
| Less Purchases from Outside Sources | 5,000 |
| "Balance" (Real Income) | $25,000 |
| Share of Real Gross Income Account ("Percentage 50%" of 25,000) | $12,500 |
| Deduct Regular Salaries paid to employees (exclusive of 2 principals) | 10,000 |
| Employees Share of Real Gross Income Credit (25% added earnings) | $2,500 |
| Reserve (20%) $ 500. | |
| Distribution (80%) 2,000. | |
| (Each employee gets additional 20% of regular salary received in period, i.e. $2,000 ÷ 10,000) | |

The balance remaining in the Reserve Account of 20% is distributed to the employees in the same proportional manner twice each year—December and June (Christmas and vacation time).

The Reserve Account of 20% is maintained to offset any uncontrollable fluctuations. It is set up to allow rather immediate payments of the 80%. Hence, in any bi-monthly period, if the total regular salaries paid should exceed the Percentage, the difference would be taken from this Reserve Account. However, any deficit balance is not carried beyond the annual fiscal accounting period. Thus, at least an annual "fresh start" is assured.

It should be noted that such fixed or overhead expenses, over which the employee has no control, do not affect the employee. Among such expenses are Rent, Light, principals' salaries or drawings, etc. This is one of the essential differences between this Income Sharing Plan and a Profit Sharing Plan, with its arbitrary share of the profit — which this is *not*. Another essential difference is that profit or not, the employees are guaranteed their percentage of the "Real Gross Income".

### SPUR TO COST REDUCTION

Some of the advantages which are being derived are as follows: Every employee has a direct interest in "holding down" expenses, since the less these expenses are, the greater the employee share. Thus, everyone involved has a direct interest in eliminating waste, unnecessary work or "trial production sketches".

During present high costs of "outside" expenses, this is particularly significant as one of the available means of using the client's overall advertising budget for media rather than to be more and more consumed in "production" expenses.

It is submitted that the essentials of this Plan can be *part* of "The Answer". The Plan is most simple and requires practically no additional records or manpower to service. The agency's bookkeeping by adoption of available work simplification is arranged to obtain the essential information without any appreciable added burden.

Here, therefore, are the guideposts for service agencies to keep abreast of the times and assure continuously profitable operations through the use of techniques of scientific management.

**Part I appeared in the May, 1950 issue of "Advanced Management."*

# The Management Bookshelf

## IMPACT OF MASS PRODUCTION ON TODAY'S SOCIETY

***The New Society: The Anatomy of Industrial Order*** by PETER F. DRUCKER, Harper & Brothers, 356 pp. $5.00.

THIS powerful and cogent book is hard to review in less than its own 356 pages. It is packed that tight. But it is required reading for investor, manager, technical or industrial engineer, supervisor, worker, union leader, politician, theologian, and many other members of the complex and confused industrial society in which we all struggle to live today.

For years Peter Drucker has been trying to see the ramified problems of this modern society in a balanced relationship to each other. In turn he has dissected its individual members, whether the passing *Economic Man* — or the budding *Industrial Man*, and the concept of its modern industrial enterprises, in both private and public corporate forms. In this new book he fits the man and the enterprise into the overall political Society of which they are a part.

In doing so he really wraps up his long task of analyzing today's Industrial Society, be it operating in a democratic, a socialistic or even a fully totalitarian state. He also takes several significant additional steps beyond those of his earlier books toward suggesting rounded solutions of its problems. Despite its clarity, sweep of language and perspective and its extremely logical outline and presentation, the resultant mixture of analysis and synthesis keeps the book from being light reading.

### STRUCTURE OF THE NEW SOCIETY

The first fifth of the text boldly blocks out the explosive spread of the principle of Mass Production in the short span of our lifetime; postulates that this revolutionary impact creates a new *kind* of Society; and then strikingly outlines the nature and salient characteristics of the resulting modern industrial enterprise. To complete this opening section as a broad background against which the rest of the author's presentation is painted, the basic facts are then developed that the modern enterprise is inherently of big size; that it has brought into being three *new* classes of key men in our industrial executives, our union leaders and our evolving, vital but currently mixed-up industrial middle class of technical, professional and supervisory people; and that it simultaneously performs economic, governmental and social functions.

The modern enterprise is still so new that its inherently collectivistic nature is yet not truly clear, nor are its deep differences from personally-owned and operated businesses or property. As in the case of the boy who ate the green apples, the resultant pains, as our society tries to swallow the modern enterprise, are very real. The answer is neither to get rid of the boy nor to give up apples, but for both the Society and the Enterprise to continue to mature before mixing too violently.

Meanwhile, as an economic institution the enterprise must perform effectively and continuously to produce goods efficiently, increasingly, and without losses. As a governmental unit, controlling the individual's access to the tools and work of production and to his own livelihood, security and dignity, it literally provides his citizenship in the society in which he lives.

As a social body the enterprise creates the plant community in which such workers' citizenship must be exercised; and in which as yet the inherent newness of the enterprise and its multiple characteristics has made it difficult for management, for union leader or for worker, to know how to bring out the creative cooperation of the individual worker, since his part in the overall process is neither readily identifiable with its end products nor itself productive except as rather rigidly integrated into a pattern of the whole institution which seems so intricate that it can hardly be seen as a whole except from the top.

### BASIC PROBLEMS OF COORDINATION

The second two-fifths of the book, in four powerful chapters, both depict and synthesize the fundamental *problems* of achieving industrial order. The major conflicts between worker and enterprise are outlined. First, over wages as cost to management but income to the man. Second, over the union, as a protection to the worker, whose ultimate service is to permit both the worker and the public to allow management of the large enterprise to exercise great power, divorced from ownership, which they can only accept as legitimate if it is thus made subject to the checks and balances which the unions develop. Third, over the individual's rights to and needs for personal status, function and human dignity in the plant; and, finally, over the basic tasks of management with its controlling need to select the field of operation in which the enterprise must operate profitably, to organize its human resources so they can be used efficiently, and to provide orderly succession of the calibre of management required for a continuity whose public necessity is paramount where so much power is concentrated over the lives of so many people — be they workers, customers or investors.

Industrial engineers and managers alike may gag in places as these problems are sketched; specifically because, while they have made great progress in knocking even most complicated production tasks down to constituent motions and micro motions, they are charged with still having much to learn in re-integrating those motions into a pattern which permits human resources to be creative rather than frustrated.

Finally, the last two-fifths of the

(*Continued on page 27, column 2*)

# *Labor Roundup*

**By Paul A. King**

*Assistant to Vice President for Personnel Bigelow Sanford Carpet Company; Member of the New York Bar*



### Baseball Slugger's Pay Illustrates Economic Message

On February 8, the *New York Times* reported that *Ted Williams,* the Red Sox baseball slugger signed for a record baseball pay of $125,000. That looks like a lot of money. But oddly, the $80,000 that *Babe Ruth* received bought him almost twice as many groceries as *Ted Williams'* record pay can buy Ted today.

This dramatic comparison illustrating the high cost of living was developed by the *Foundation For Economic Education* of Irvington-On-Hudson, New York. The comparison can be secured from the Foundation in quantity at a nominal charge.

### Contract Clause Gives Reason For Superseniority

Superseniority for union committeemen is not always a popular idea among rank and file union members — particularly in times of heavy layoffs.

An unusual clause in the contract between *Glamorgan Pipe and Foundry Company* of Lynchburg, Virginia, and the *United Steelworkers of America, (CIO)* explains why superseniority benefits both employee and employer. It reads:

> "The intent of this provision is to retain in active employment the Union President and Grievance Committeeman for the continuity of performance in the administration of this contract and in the interest of employees so long as a work force is at work. . ."

### Safety Violators Receive Summons

Employees of *General Mills, Inc.* of Buffalo, N. Y. receive a "summons" when they violate a safety rule. The summons calls the violators before a safety committee where their infraction is discussed with them and the importance of obeying accident prevention rules is emphasized.

The summons' are issued by the members of the company's safety committee, the supervisors and foremen.

Word of caution: A union might not take to the idea easily. Before putting its plan into effect, *General Mills* convinced its union stewards that there would not be any discrimination in the application of the system.

### Preparation Of Organization Charts Simplified

Organization charts are essential tools of management but their chief drawback is keeping them up to date — economically and quickly.

*Chart-Pak, Inc.,* of Stamford, Connecticut, has developed a device for changing charts as required by simply removing the out-of-date box on a master and substituting the current box. The entire chart need not be redrawn.

The company claims that a secretary can turn out the product of a draftsman in a fraction of the time, at a fraction of the cost.

### One Day Off For Each Two Days Of Work

Sounds fantastic, doesn't it? But, as *H. C. Turner, President of the Turner Construction Company* of New York City, pointed out — it is true for nearly all businesses that operate on the 5-day week basis. *Turner* called these facts to the attention of his employees in his periodic message to them. Here are the figures he uses:

| | | |
|---|---|---|
| Days in a year | | 365 |
| Saturdays and Sundays | 104 | |
| Holidays (assume) | 8 | |
| Vacation (week days) | 10 | |
| Non-work days | | 122 |
| Work days | | 243 |

### High School "Kids" Get Firsthand Training In Business Practice

To give commercial course students of a neighboring high school a first-hand knowledge of modern business and office practices, *Dravo Corporation* of Pittsburgh, made arrangements to "employ" them for a six-week period.

Each student is interviewed and given appropriate business aptitude and skill tests covering their commercial training. Work assignments are then based upon qualifications and departmental requirements.

The students, who receive no pay, work only half a day but under virtually the same conditions as regular employees. They punch the time clock and receive work assignments from supervisory employees in various departments.

Efforts are made to permit each student to try different types of work in each department.

The practice has created much goodwill for the company in the community; has familiarized students with work opportunities at the *Dravo* plant.

### George And His Family Tell The Company Story

Handbooks for employees describing company activities are commonplace. But *Lederle Laboratories* of Pearl River, N. Y. has just prepared one that is outstandingly different.

The booklet — about 35 pages — starts out with a picture of employee George and his family relaxing on the front lawn of their suburban home on a warm Sunday afternoon. They are talking. "The conversation somehow arrives at George's telling his family what life is like at Lederle". At this point, George, with words (very few and pictures (very many) and a quiet sense of humor introduces his family to the people of Lederle—and the equipment and buildings.

The booklet — called, *"This, Our Life"* — is a special edition of the company magazine, *"Lederle Chevron"*. It is distributed in the community and to branch offices as well as to all employees. If you'd like to see a copy write to editor *Eileen Bernard* at Pearl River, New York.

# SOCIETY NEWS

**THE STATE UNIVERSITY OF IOWA** is conducting its Eleventh Summer Management course from June 12 through June 24, 1950. Emphasized are Production Planning, Job Evaluation, Motion and Time Study, Wage Incentives, and related subjects.

The program is under the directorship of *J. Wayne Deegan*, Professor of Industrial Engineering, College of Engineering, State University of Iowa. The teaching staff is made up of 17 outstanding men in the field of scientific management. They include a group of Industrial Engineering Professors and several top management men from leading industrial companies.

**THE PITTSBURGH CHAPTER** conducted their First Annual Essay Contest for Student members in the Pittsburgh area. The winner was *John J. Korn* of Duquesne University. His essay, *"Industrial Democracy Through Financial Incentives,"* won him an all-expense trip to the Annual Time Study and Methods Conference in New York. Chairman of the Contest Committee was *Professor W. R. Turkes*, University of Pittsburgh, Director of Education.

**DALE YODER,** Director of the Industrial Relations Center at the University of Minnesota, and active member of SAM's Twin City Chapter, was the featured speaker at the American Society for Personnel Administration Annual Convention in Detroit on June 8th. His subject: *"The Marks of Professionalization."*

Professor Yoder recently completed revisions and additions to his popular textbook *"Labor Economics and Labor Problems"* which publishers McGraw-Hill have just released in its fifth edition.

**DAVID L. RINGO,** Executive Vice President of the Society for Advancement of Management, Cincinnati Chapter, has been named President of the Cincinnati, Newport and Covington Railway Company and the Dixie Traction Company of Northern Kentucky. Mr. Ringo joined the C. N. & C. Railway as a laborer in 1930. He worked as timekeeper, rodman, mileage clerk, and assistant engineer before being transferred to the transportation department.

He subsequently held the positions of traffic engineer, assistant superintendent of transportation, and superintendent of transportation before being elevated to assistant general manager in March, 1945. He became general manager in 1947 and last year was named Vice President.

**Emerson Trophy Standings**
**Chapter Performance Award**
**Plan — As of April, 1950**

| CHAPTER | TOTAL |
|---|---|
| Washington | 3457 |
| Cleveland | 3454 |
| Philadelphia | 2834 |
| Pittsburgh | 1936 |
| Cincinnati | 1712 |
| Chicago | 1479 |

**WALTER D. FULLER,** of the Philadelphia Chapter, has been elected to the newly-created position of Chairman of the Board of Directors of The Curtis Publishing Company. Advancement by Mr. Fuller to the new top position in Curtis management climaxes his career with the company which began in 1908. He has been successively Comptroller, Secretary, Vice President, and, since 1934, President.

**PHILADELPHIA CHAPTER** heard R. Conrad Cooper, Vice President in charge of Industrial Engineering, U. S. Steel Corp., speak at their May meeting. His subject, *"How Can Staff Functions Be Integrated With the Line Organization?"*

**NEW YORK CHAPTER** will present their Annual Student Award to outstanding students in local chapter activities at their June meeting. *H. Harold Egan* of St. John's University and *Steven Purcell* of N.Y.U. are two of the men chosen for this award.

The June 15th dinner meeting, last one of the season, will present *Dr. Luther Gulick* as the featured speaker.

**TRENTON CHAPTER** presented Frank Merry, Plant Manager, Bayer Co. Division of Sterling Drug, Inc., at their April meeting. He spoke on *"What Controls Mean to the Plant Manager."*

**BALTIMORE CHAPTER** devoted their May meeting to local student chapters. A panel discussion on, *"If I were Graduating This Year,"* was conducted by Senior members who are experts in the field of employment.

**WASHINGTON CHAPTER** has expanded their Executive Development Round Table into a new group called "The Institute on Executive Selection and Development." Joint sponsors of the Institute with S.A.M. are: Society for Personnel Administration, Federal Personnel Council, Interdepartmental Training Officers Conference, American Society for Public Administration. The chairman is U. S. Civil Service Commissioner Mitchell.

**LANCASTER CHAPTER** visits York Corporation plant at York, Pennsylvania.

**MILWAUKEE CHAPTER'S** May meeting concentrated on Quality Control. The following speakers discussed the subject from the Engineering and Management points of view: *R. H. Colvin*, Burd Piston Ring Co., *Wade R. Weaver*, Director of Quality Control for Republic Steel Corp.

The June meeting will be open to members' wives. Buffet refreshments and dancing are scheduled. *George Sievers* will act as Master of Ceremonies.

**SLOAN FELLOWSHIP** program of Massachusetts Institute of Technology offers a special one year program of executive development for outstanding young business executives. Details are available from G. B. Tallman, Director, Sloan Fellowship Program, M. I. T., Cambridge, Mass.

**MICHIGAN STATE COLLEGE** announces its Second Annual Industrial Engineering Conference to be held September 11 to 15, 1950. The six major groups to be covered by the conference are: Executive Personnel, Chief Industrial Engineers, Beginning Time and Motion Study, Advanced Time and Motion Study, Plant Layout and Materials Handling, Production and Materials Control.

Groups will be conducted on a conference or "seminar" basis, with a well qualified leader and many practical authorities from industry.

# Management Bookshelf *(continued)*

*(Continued from page 24, column 3)*

book, also in four pungent chapters, set forth the *principles* of Industrial Order which Peter Drucker believes must be understood and used — singly and in good integrated balance — to solve the previously defined problems. This part of the text pulls together many ideas earlier proposed, both by the author and by earlier pioneers in the field, like Mary Parker Follett, and many others since Taylor who have long realized that the problems of industrial order require resolving the struggles for power involved so that the power may be controlled for the protection and progress of society and by integration of the efforts of management, workers, unions and government lest otherwise such power be nullified so the enterprise can't function or left ungoverned so that it will destroy itself.

Drucker rightly realizes that in either of such latter eventualities, government intervention will ensue to the degree where State direction, rather than regulation, of the enterprise and the plant community will destroy freedom for the enterprise, for its workers and for society as a whole.

**TRENTON CHAPTER visits DeLaval Steam Turbine Company plant at Trenton, N. J.**

### CHALLENGING BOTH SIDES

As the author sets forth his principles for avoiding such catastrophe and such loss of our freedom, he challenges management and union leaders alike to re-examine their functions and their aims, so that jointly they may develop the leadership required to produce a free, yet a livable, Society for our time.

The proposed principles cover four broad areas. First, genuine recognition of Labor as a human resource and as a capital, or long term, rather than as a commodity or expendable resource of the business; and provision of specific plans for stabilization of worker income, by realizing that the right to security, of opportunity and even of income to live must attach to the individual human being, not merely to his job or its cost in the economic pattern.

Second, grasp and application by management of the principles of federal organization, which is more than mere functional decentralization in that genuine managerial powers are assigned both at the top and in the decentralized sectors, with abuse of such power at either end checked by the dual requirement to compete for capital in the investment market and to attract continuing customers with properly-priced and valuable goods or services in the consumer market.

Third, retention of management's authority, and necessity, to manage; while yet finding ways to treat the worker as a creative person and citizen, rather than an inanimate mechanical tool, in the production processes and control — or even self government — of the plant.

Fourth, realization that the permanent functions of the union and its leadership, as their place in our Industrial Society is fixed and matured, must be different from those of Labor's crusading formative years; must be exercised with responsibility commensurate with the power enjoyed; and must, like the

*(Continued on page 28, column 1)*

functions of management or any other limited group, be clipped or restricted if any right, even the vital right to strike, be exercised so selfishly as to fail in meeting the binding social requirement to conform any private power to the public interest.

The last, or principles, part of "*The New Society*" is still a "what-to-do" book, definitely not a "how-to-do-it" handbook. Many of the principles set forth already have wide acceptance and even broad application. Others are still on the fuzzy side and it is to be hoped that in successive books Peter Drucker will bring more of these suggested solutions of our Industrial Society's problems to focus; just as this volume distills down and purifies the analyses of the nature of the enterprise and its problems which were first broached in his earlier writings.

### SELF-GOVERNMENT AND MIDDLE MANAGEMENT

There are two areas in which this is especially to be hoped; namely in application of his principle for self-government in the plant community and in clarification of the place of the new industrial middle class of professionals, technicians, foremen, etc. in management, rather than in the ranks. The author's present approach to plant self-government recognizes the lessons from the Hawthorne experiments and the Scanlon plans, yet it still seems to dodge behind a refuge in group action which recognizes the value of a team, yet doesn't fully swallow that it is individuals with highly personal rights and aims, who actually respond to incentive, not the "team" as such. Nor does superposition of some as yet too vaguely visualized "plant self government" on top of both the management and the worker (individually and collectively in his union) seem like an answer rather than a probable source of multiplied confusion in continuing practical operation.

More likely the final solution here must come from greater growth and skill of the existing parties, both managers and union leaders, so that they can ultimately, and despite their separate political handicaps, learn to decentralize the right authority to the plant level where local management and union leadership can so exercise it as to secure the greater worker participation which Drucker seeks within the established organization framework and so weight their respective checks and balances as to present an integrated, if unstable, approach to which the workers' allegiance, which still divided between them, can be attached to their joint net benefit.

Similarly, the present presentation of the plight of middle management is yet much clearer than the proposals for helping these key people to find themselves in the industrial organization. But the pattern is plainer as to this problem and already leaves the feeling that with further time Drucker can offer great help in showing how the new functions which these middle managers perform in the modern enterprise are truly extensions of the managerial task, which thus takes on new chores in such institutions beyond those of management in pre-industrial organizations and in non-industrial organizations like those of State, Army and Church.

In fine, "*The New Society*" is definitely a thought generator for management men; and for all who aspire to see whole the problems of the mass-production Enterprise and who dare to dream of a practical, integrated solution of those problems through the imagination, the courage and the trying of free men — continuing to discipline themselves in a Free Society, while yet following Virgil Jordan's classic admonition that for success in such direction you must, "Discover how — and do it yourself." If Peter Drucker has not yet given us the "How Handbook" he has at least outlined its ultimate table of contents for us.

Harold F. Smiddy
Vice President
S.A.M. Management Research
and Development Division

## EFFECTIVE IDEA "SELLING"

***Time Out for Mental Digestion***
by Robert Rawls, The Updegraff Press, Limited, Scarsdale, New York, 45 pp. $1.00. (Also, bulk prices)

HERE is an invaluable half-hour of reading in the field of human relations. Invaluable in that it approaches this vital area at its "grass roots" and at a point where each of us can make constant applications of the suggestions offered.

Many able men and women are not as successful as they could be in "selling their ideas and their plans to people. Their trouble is that unwittingly, they give others "mental indigestion".

How big a job a man can handle, how high he can rise in business or professional life, depend chiefly on three things: the breadth and quality of his experience; his ability to think and plan; and, his success in dealing with people.

The third qualification is the final test. A few geniuses succeed by themselves. Most of us must enlist the help of other men and women in carrying out our plans and projects. To do this we must "sell" them our ideas. It is here that we encounter the reality of mental digestion.

### SERVING IDEAS

In this attractive brochure, Robert Rawls presents an important discovery in an always current field. He shows interestingly, concisely, and in thoroughly practical fashion, the cure for this all-too-common failing. He explains how to organize and "serve" ideas in such a way that people can digest them easily.

The reader will learn how to work more effectively with his business or professional associates, how to win acceptance for his plans and suggestions, how to be a more effective and influential person. He will discover, also, how to improve his own mental digestion, and how to be surer of the soundness of his ideas before exposing them.

The reality of mental digestion is an important discovery in human relations; and this brochure is worthy of wide distribution in organizations of every type.

We think, too, it will prove of inestimable value to lawyers, consultants, doctors, ministers, teachers, public speakers, and men and women in public life — all who must counsel, teach, influence or convince the public.

### CONFERENCE TIME SAVER

For the businessman, on conference-time costs alone this brochure will literally save its weight in gold.

J. F. Meister